Hydrogeologic Services Report - Revised

Critical Aquifer Recharge Area Report
The Osprey
Proposed Residential Development
King County Tax Parcel 9270700080
7440 159th Place NE
Redmond, Washington

for
G.W. Williams Co. and
Cleverly Development Consulting

September 16, 2019

GeoEngineers
Earth Science + Technology

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File No. 23699-001-01

September 16, 2019

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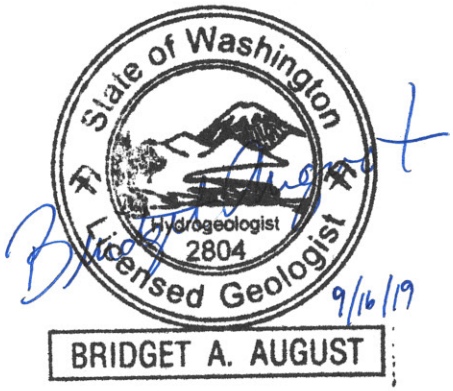

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Table of Contents

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

GeoEngineers, Inc. (GeoEngineers) is pleased to submit this Critical Aquifer Recharge Areas (CARA) evaluation and revised report for the proposed residential development (The Osprey) on property located at 7440 159th Place NE in Redmond, Washington. The property is identified as King County Tax Parcel Number 9270700080. The revisions to this report result from review comments by the City of Redmond.

The location of the site is shown on the Vicinity Map, Figure 1. The project site is shown in relation to surrounding features on the Site Plan, Figure 2.

1.1. Project Description

We understand the property will be redeveloped with a multi-story, mixed-use residential building. Based on conceptual plans prepared by the project architect, HKS, Inc., and dated May 30, 2019, the project will consist of a six-story building with one level of below-grade parking. The ground level will include additional parking, retail and residential spaces and the upper five stories will include residential space. The floor slab for the basement is planned to be approximately 10 feet below existing grade. An elevator pit will extend to about 15 feet below existing grade.

The building footprint will occupy nearly the entire 0.62-acre site. An infiltration trench for discharge of pre-treated site stormwater runoff is planned between the east side of the building and the adjacent east property line.

1.2. Purpose and Scope

The purpose of this study is to evaluate hydrogeologic conditions for the site under existing and developed conditions and prepare a CARA report in accordance with the following City of Redmond documents.

- Application Requirements for PREP [Pre-Review Entitlement Process] – Land Use Entitlement.
- Appendix 1.F, "Critical Areas Reporting Requirements – Critical Aquifer Recharge Areas (Wellhead Protection)" of the Redmond Zoning Code (RZC), Sections 21.64 – 21.72.

In accordance with Appendix 1.F, a Level One Hydrogeologic Assessment is required for this site because it is located within the City's mapped Critical Aquifer Recharge Area I. The site boundary is shown in relation to the City's Critical Aquifer Recharge Areas in Figure 3. In addition, a Level Two Hydrogeologic Assessment is required because the proposed development will result in 5,000 square feet or more of impervious site area.

Our services were completed in accordance with our revised proposal dated May 20, 2019. Written authorization to proceed with our design phase and permitting services was provided by Sean Williams of G.W. Williams Co. on May 20, 2019.

The RZC Section 21.64.060 lists Geologically Hazardous Areas (Landslide, Erosion and Seismic Hazard Areas) as critical areas with related reporting requirements included in Appendix 1.E. Our Geologically Hazardous Areas report for this project was submitted separately (GeoEngineers 2019a). GeoEngineers' design phase geotechnical report was also submitted separately (GeoEngineers 2019b).

2.0 REQUIREMENTS OF REDMOND ZONING CODE

The following sections are quoted from RZC Section 21.64.050 and classify CARAs in relation to the City's Wellhead Protection Program, with reference to specific sections of the Washington Administrative Code (WAC) and the Regulatory Code of Washington (RCW):

> *Critical Aquifer Recharge Areas within the City of Redmond shall be rated or classified according to their characteristics, function and value, and/or their sensitivity to disturbance.*
>
> 1. *Critical Aquifer Recharge Areas Classification. Critical aquifer recharge areas are those areas with a critical recharging effect on aquifers used for potable water. Wellhead protection involves the management of activities that have a potential to degrade the quality of groundwater produced by a supply well. The City of Redmond is classified into two critical aquifer recharge areas that are based on proximity to and travel time of groundwater to the City's public water source wells, and are designated as follows:*
>   a. *Critical Aquifer Recharge Area I is the land area overlying the aquifer in which it will take a maximum of five years for the groundwater to reach any public water source well owned by the City.*
>   b. *Critical Aquifer Recharge Area II is the land area overlying the aquifer in which it will take over five years to reach any public water source well owned by the City.*
> 2. *Classification of Critical Aquifer Recharge Areas shall be determined in accordance with the City's adopted Critical Aquifer Recharge Areas Map.*
> 3. *Relationship of Critical Aquifer Recharge Areas to Wellhead Protection Zones (WAC 246-290). The City of Redmond Water System Plan and Washington State Department of Health require public water supply wells have wellhead protection zones delineated based on the time of travel of groundwater to a public drinking water supply well. The relationship between the Wellhead Protection Zones and the Critical Aquifer Recharge Areas are as follows:*

Table 21.64.050A

Wellhead Protection Zone	Wellhead Protection Zone Time of Travel	Critical Aquifer Recharge Areas
Sanitary Control Area	150-foot radius, no horizontal time travel	Critical Aquifer Recharge Area I
Wellhead Protection Zone 1	6-month and 1-year horizontal time of travel	
Wellhead Protection Zone 2	5-year horizontal time of travel	
Wellhead Protection Zone 3	10-year horizontal time of travel	Critical Aquifer Recharge Area II
Area outside of Wellhead Protection Zone 3	Area outside of the 10-year time of travel that has a critical recharging effect on the aquifer.	Critical Aquifer Recharge Area II (includes all other lands providing critical recharging effect on the aquifer)

In addition, RZC Section 21.64.050, Subsection C lists Prohibited Activities in Critical Aquifer Recharge Areas I and II, as follows:

> 1. *Land uses or activities for new development or redevelopment that pose a significant hazard to the City's groundwater resources, resulting from storing, handling, treating, using,*

producing, recycling, or disposing of hazardous materials or other deleterious substances, shall be prohibited in Critical Aquifer Recharge Area I. Legal preexisting uses may continue to operate. These land uses and activities include:

a. *Large on-site sewage systems, as defined in WAC Chapter 246-272A;*

b. *Hazardous liquid pipelines as defined in RCW Chapter 81.88 and RZC 21.78;*

c. *Solid waste landfills;*

d. *Solid waste transfer stations;*

e. *Liquid petroleum refining, reprocessing, and storage;*

f. *Bulk storage facilities as defined in RZC 21.78, Definitions;*

g. *Hazardous waste treatment, storage, and disposal facilities except those defined under permit by rule for industrial wastewater treatment processes per WAC 173-303-802(5)(c);*

h. *Chemical manufacturing, including but not limited to organic and inorganic chemicals, plastics and resins, pharmaceuticals, cleaning compounds, paints and lacquers, and agricultural chemicals;*

i. *Dry cleaning establishments using the solvent perchloroethylene;*

j. *Primary and secondary metal industries that manufacture, produce, smelt, or refine ferrous and nonferrous metals from molten materials;*

k. *Wood preserving and wood products preserving;*

l. *Mobile fleet fueling operations;*

m. *Class I, Class III, Class IV, and the following types of Class V wells: 5A7, 5F1, 5D3, 5D4, 5W9, 5W10, 5W11, 5W31, 5X13, 5X14, 5X15, 5W20, 5X28, and 5N24 as regulated under RCW Chapter 90.48 and WAC Chapters 173-200 and 173-218, as amended;*

n. *Permanent dewatering of the aquifer;*

o. *Irrigation with graywater;*

p. *Reclaimed or recycled water use with the exception of uses that discharge to the sanitary sewer;*

q. *Sand, gravel, and hard rock mining;*

r. *Mining of any type below the upper surface of the saturated groundwater;*

s. *Disposal of radioactive wastes, as defined in chapter 43.200 RCW;*

t. *Hydrocarbon extraction;*

u. *Golf courses;*

v. *Cemeteries;*

w. *Vehicle wrecking yards;*

x. *Vehicle towing yards that store vehicles on permeable surfaces; and*

y. Metal recycling facilities with outdoor storage and handling activities.

2. *The following are prohibited in Critical Aquifer Recharge Area II. Legal preexisting uses may continue to operate:*
    a. Permanent dewatering; and
    b. Reclaimed or recycled water use with the exception of uses that discharge to the sanitary sewer.
3. *Other land uses and activities that the City determines would pose a significant groundwater hazard to the City's groundwater supply.*

3.0 SITE DESCRIPTION

The project site consists of one parcel (King County Tax Parcel Number 9270700080) as shown on Figure 2. The site comprises approximately 0.62 acres and is located at 7440 159th Place NE in downtown Redmond, Washington.

3.1. Geology

The project lies in the downtown Redmond area of the Sammamish River valley. The valley is a major glacial trough between glaciated uplands to the west and east. The valley trends north to south and is underlain by recent alluvium and glacial recessional outwash sediments.

Geologic information for the project vicinity was obtained from the map entitled "Geologic Map of the Kirkland Quadrangle, Washington" (Minard 1983) published by the United States Geological Survey (USGS). The native geologic unit mapped in the site vicinity consists of alluvium. The alluvium is mapped along and east of the Sammamish River and consists primarily of near-surface organic-rich fine sand, silt and clay. Peat layers are often present in the upper few feet of the alluvium. Sand and gravel alluvial deposits underlie the surficial soils.

Fill associated with past grading for existing building and pavement areas mantles the alluvial deposits.

Recessional outwash deposits are known to underlie the alluvium at depth. The recessional outwash typically consists of sand and gravel with variable silt, cobble and boulder content deposited by meltwater flowing from a receding ice sheet that occupied the Sammamish River valley during the last glacial epoch.

3.2. Surface Conditions

The site is bounded on the north by a recently completed apartment building (The Carter), on the east by wooded Heron Rookery Park, on the south by Leary Way NE, and on the west by 159th Place NE. The property is owned by G.W. Williams Co. and is currently occupied by automotive facilities (A1 Luxury Motors and Harvey's Auto Service). A one-story automobile repair shop occupies the east part of the site. Asphalt paved parking and driveway areas are in the north and west parts of the site.

The existing shop building was constructed in 1968. The property was historically operated as Evans Auto Center. Occupants of the building have included auto repair businesses going back to the first occupants following construction of the building. Prior tenants have also included a feed company, a carpet and interiors company, and an appliance services company.

The ground surface is generally level. The finished floor of the existing building is at about Elevation 43 feet. (Elevations in this report refer to the North American Vertical Datum of 1988 [NAVD 88].) Surface grades outside the building range from about Elevation 41 to 43 feet. Underground power and fiber optic lines extend along the west edge of the site.

3.3. Previous Subsurface Explorations

GeoEngineers completed geotechnical engineering services in 1988 for improvements to Leary Way, which extends along the south side of the site. Several borings were drilled as part of that project, including a boring (B-7) about 125 feet southwest of the intersection of Leary Way and 159th Place NE (see Figure 2).

Associated Earth Sciences, Inc. (AESI) completed geotechnical engineering services for the adjacent properties to the north (7494 and 7500 159th Place NE), which are summarized in a report dated April 18, 2014. Several borings were drilled for that project, including a boring (EB-4) near the northwest corner of the subject property. AESI also completed a hydrogeologic and infiltration assessment for the adjacent properties in 2015; the assessment included test pits and additional borings.

A Phase II Environmental Site Assessment (ESA) for the subject property was completed in 2018 by G-Logics, Inc. and summarized in a report dated June 28, 2018. The Phase II ESA included 11 borings, three of which were completed as groundwater monitoring wells (GLMW-1, GLMW-2 and GLMW-3), with the remaining eight borings (GLB-1 through GLB-8) being backfilled. The approximate locations of these borings and monitoring wells are shown on Figure 2.

Logs of the previous GeoEngineers, AESI and G-Logics explorations are included in Appendix A of this report.

Private water supply wells within 1,300 feet of the project site are shown on the Water Well Location Map, Figure 4. Available logs of the wells are included in Appendix B of this report and are discussed in a subsequent section.

3.4. Subsurface Soil Conditions

Based on our review of available subsurface information, the subsurface soils at the site generally consist of varying thicknesses of fill overlying medium dense to dense granular alluvial and recessional deposits, as discussed below:

- **Pavement and Floor Slab Materials:** Several of the borings were drilled within asphalt paved areas and within the existing building. The thicknesses of the pavement and floor slab were not noted on the boring logs.
- **Fill:** Existing fill was apparently encountered in the upper 5 feet of borings GLMW-3 and GLB-8, based on the presence of wood fragments. The fill layer is described as loose sand with gravel. The remaining boring logs did not note the presence of fill.
- **Granular Alluvium/Recessional Outwash:** Medium dense to dense sand and gravel deposits were encountered in each of the explorations and extend to the maximum depth explored, 41½ feet. The upper portion of these deposits is alluvium, while the lower portion could be recessional outwash. Cobbles and boulders are known to be present in the alluvium and recessional outwash.

3.5. Groundwater Conditions

Groundwater was encountered in the previous explorations and monitoring wells within about 18 to 20 feet of the existing ground surface, based on measurements made in late June 2018. We measured groundwater levels in the wells at similar depths on March 1, 2019.

This groundwater represents a shallow aquifer within the near-surface alluvial soils that is part of the Redmond Alluvial Aquifer underlying the downtown area. This aquifer is in direct hydraulic connection with the Sammamish River, located within 200 feet of the southern part of the site. Groundwater flows to the north and northwest to the Sammamish River. Based on our recent measurements, the groundwater gradient across the site is approximately 0.004 (0.4 feet of elevation difference over a horizontal distance of 100 feet).

We expect the groundwater level will rise in response to seasonal precipitation and flood stages of the river and could be as high as 7 to 10 feet below the ground surface (or at approximately Elevation 35 to 32 feet) during flood stage.

Historical groundwater level data from a nearby City monitoring well (MW327) located southeast of the intersection of Leary Way NE and 150th Place NE indicates the highest groundwater elevation during the period from 2000 through 2014 was approximately Elevation 30 feet. (This ground water elevation will be used as the design seasonal high groundwater level for the infiltration facility to be located along the east side of the site.)

3.6. Water Well Logs

It is our understanding that all homes and businesses in the downtown Redmond area receive potable drinking water from the City of Redmond. However, as shown on Figure 4, four domestic wells have been identified within 1,300 feet of the project site. One well log was identified using the Washington State Department of Ecology (Ecology) Washington State Well Report Viewer (Ecology 2019) and three additional domestic wells were identified using King County iMap (King County 2019), as labeled on Figure 4. The well log for the Ecology well (Shoemaker) is provided in Appendix A. Well logs for the three King County iMap wells were not available.

Location information for the Ecology well (Shoemaker), which was installed in 1964, is extremely limited and the well cannot be located to an address or parcel. The well has been located on Figure 4 based on the ¼-¼ Section, as indicated on Ecology's website. The iMap wells have been located on Figure 4 based on their iMap locations. Table 1 summarizes water supply wells found within 1,300 feet of the project site.

TABLE 1. SUMMARY OF WATER SUPPLY WELLS

Well Number	Well ID	Owner	Well Depth (feet)	Groundwater Elevation[1] (feet) and Date of Reading
1	351507	SHOEMAKER	76	23.02 (10/28/1964)
2	R_474021122074201	FLOWERS	27	NA
3	R_474022122074001	NA	65	NA
4	R_474022122073101	GRAHAM	15	NA

Notes:

1. Well locations are shown on Figure 4.

NA = Not available.

No Group A water systems and no springs were identified within the search radius. Based on the available data, the project site does not lie within the 150-foot sanitary control radius of any off-site domestic wells. It should also be noted that the identified wells may no longer exist due to redevelopment of the downtown Redmond area and readily available drinking water from the City of Redmond.

4.0 PROPOSED IMPROVEMENTS

The proposed project includes a multi-story residential building that will occupy most of the property. A preliminary layout of the building area is shown in Figure 2. A one level below-grade parking structure is planned for the building. Suitable foundation support will consist of shallow foundations placed directly on the medium dense to dense granular alluvial soils, or on a zone of compacted crushed rock fill replacing loose soils that may be encountered at footing subgrade level. An infiltration trench will be located along the east side of the building.

5.0 CRITICAL AQUIFER RECHARGE AREAS EVALUATION

The specific information required by the City of Redmond to complete the CARA evaluation is described in this section, in accordance with RZC 21.64-21.72 and related Appendix 1, Sections A and F. The information requirements are reproduced below, with specific responses for the project provided in bold.

5.1. General Information (Appendix 1.A)

The following General Information is required to be submitted for sites containing critical areas.

1. *Name of proposal as shown on City applications.* **The Osprey**
2. *Name of applicant as shown on City applications.* **G.W. Williams Co.**
3. *Name of organization and individual providing this information.* **GeoEngineers, Inc. Bridget A. August, LG, LHG and Mark P. Molinari, LG, LHG of GeoEngineers complied and provided the information in this report.**
4. *List any technical expertise/special qualifications of person providing this information.* **Bridget August is a Washington licensed hydrogeologist with 13 years of experience in the Pacific Northwest. Her hydrogeologic project experience includes extensive subsurface stratigraphic exploration evaluations, groundwater supply studies, groundwater resource evaluations, water rights investigations, aquifer testing and analysis, and stormwater infiltration analysis. She has been responsible for numerous groundwater monitoring projects and has provided technical expertise for the completion of multiple Environmental Impact Statements and Critical Aquifer Recharge Area studies.**

   Mark Molinari is a Washington licensed hydrogeologist with 36 years of experience providing technical services and project management for hydrogeologic assessments of hazardous waste investigations and remedial actions, ESAs/audits, siting studies, wellhead protection, environmental impact statements/reports and permits throughout the western U.S. His project experience includes a wide range of commercial, industrial, governmental and energy facilities.
5. *Date the information was prepared.* **September 16, 2019.**

6. *Location of the proposed activity (street address and tax parcel number), including a vicinity map.* **The proposed development will be located at 7440 159th Place NE near downtown Redmond, Washington, as shown on Figure 1. The project site is identified as King County Tax Parcel Number 9270700080.**

7. *Clearly identify the development proposal being addressed, including City file number and key project drawing references (originator of drawings, originator's reference number if shown on the drawings, sheet numbers, revision numbers and dates for each sheet, and include reduced copies of key drawings in the report).* **The City of Redmond has identified the project number as LAND-2019-00124. A preliminary layout of the building and an infiltration trench is shown on a drawing prepared by the project civil engineer, DCI Engineers, Inc. (Sheet C-1, DCI Project Number 19012-0002, dated February 1, 2019). The drawing is included as Figure 5 in this report. Additional project drawings will be prepared by DCI Engineers as part of the permit application process.**

8. *Give a succinct but inclusive description of the existing site, including acreage and current and past uses on the property.* **The site comprises approximately 0.62 acres. A summary description of the site and current and past uses of the site is provided above in the section "Surface Conditions."**

9. *A copy of an aerial photo with overlays displaying site boundaries and critical areas.* **An aerial photo is included as Figure 4. The Critical Aquifer Recharge Area applicable to this site includes CARA I (Figure 3).**

10. *A single map showing all critical areas at one inch equals 20 feet scale, depicting:*

    a. *Identified critical areas and required buffers;*

    b. *Limits of any areas to be disturbed;*

    c. *Site boundary property lines and roads;*

    d. *Rights-of-way and easements;*

    e. *Existing physical improvements (buildings, fences, impervious surfaces, utilities, etc.);*

    f. *Contours at two-foot intervals;*

    g. *All natural and manmade features within the maximum buffer area of any critical area on or near the site (in no case less than a minimum 50 feet from the site).*

    The above information is shown on Figure 2. (The full size [22 inches by 34 inches] PDF version of Figure 2 is at a scale of 1 inch equals 20 feet.) The entire site is located within mapped CARA I.

11. *A statement specifying the accuracy of the report and key project specific assumptions made and relied upon. List recommendations, if any, for further reporting regarding critical areas related to the proposed project as the project proceeds.* **Our evaluation is based on review of available subsurface information from the sources identified in the section "Previous Subsurface Explorations" above and geologic mapping, well logs available online through Ecology, and our experience with the City's Wellhead Protection Program.**

12. *Provide a bibliography of published information referenced, including maps and best available science materials.* **A bibliography or reference section is provided at the end of the text of this report.**

a. *For sites with mitigation, also provide the following information identified in 13 through 17 below. (Information in this section is to be provided only if there are critical areas within or in the vicinity of the site that will be impacted by the proposed project.)*

13. *A summary description of reasonable efforts made to apply mitigation sequencing pursuant to RZC 21.64.010.L, Mitigation Standards, Criteria and Plan Requirements, to avoid, minimize and mitigate impacts to critical areas.* **Stormwater will be infiltrated along the east side of the site. The water will be treated prior to entering the infiltration facility (trench). Other than implementation of required Best Management Practices (BMPs), no other mitigation measures are planned at this time.**

14. *Plans for adequate mitigation, as needed, to offset an impact, including but not limited to:*

    a. *The impacts to on-site and affected off-site critical areas; and*

    b. *The impacts of any proposed alteration of a critical area or buffer on the development proposal, other properties, and the environment.* **No specific mitigating measures other than pre-treatment of water to be infiltrated and BMPs are planned at this time.**

15. *A listing of applicable performance standards and a summary of how each applicable performance standard was addressed. (See RZC 21.64.010.M, Performance Standards for Mitigation Planning.).* **N/A.**

16. *A discussion of ongoing management practices that will protect the critical area after the project site has been developed, including proposed monitoring and maintenance programs.* **The project will meet the drainage requirements of the 2014 Ecology Stormwater Management Manual for Western Washington (2014 SWMMWW) and City of Redmond Stormwater Management Technical Notebook (Technical Notebook). In addition, a Stormwater Pollution Prevention Plan (SWPPP) will be prepared as part of the NPDES stormwater permit requirement for the project.**

17. *Additional information may be required. The Technical Committee may require additional information to be included in the critical areas report when deemed necessary to the review of the proposed activity.*

5.2. Critical Aquifer Recharge Area Reporting Requirements (Appendix 1.F)

The following Critical Aquifer Recharge Areas (Wellhead Protection) Reporting Requirements from Appendix 1.F are in addition to the General Information listed in Appendix 1.A above. **The responses provided below satisfy or provide references to documents that satisfy the reporting requirements listed in this section.**

A critical aquifer recharge areas report shall be prepared by a qualified professional who is a hydrogeologist, geologist, or engineer, who is licensed in the State of Washington and has experience in preparing hydrogeologic assessments.

1. *A critical aquifer recharge area report must be submitted to the City. The purpose of the report is to evaluate the actual presence of geologic conditions giving rise to the critical aquifer recharge area; determine the appropriate wellhead protection zone; evaluate the safety and appropriateness of proposed activities; and recommend appropriate construction practices, monitoring programs, and other mitigation measures required to ensure achievement of the purpose and intent of these regulations. The information required by this report should be coordinated with the study and reporting requirements for any other critical areas located on the site.* **Geologic conditions and the**

identification of the appropriate wellhead protection zone for the project site are described above. The proposed development will not increase the area of impervious surfaces and volume of runoff compared with existing conditions. Recharge to the Redmond Alluvial Aquifer will be enhanced by routing treated stormwater to the proposed infiltration trench along the east side of the site, which will serve as a flow control BMP. Other BMPs will be implemented during project construction so that water quantity and quality is not adversely impacted. As described previously, the project is being designed to meet the drainage requirements of the 2014 SWMMWW and the Redmond Stormwater Technical Notebook.

2. *The approach of the City of Redmond critical area regulations is to require a level of study and analysis commensurate with potential risks to wellhead protection areas associated with particular sites and particular proposals. Geologic, hydrologic, and/or topographic studies may be required. At a minimum, all applicants shall review the history of the site and conduct a surface reconnaissance.* **As part of our CARA evaluation we reviewed available geologic maps, borings logs, property history, King County iMAP aerial topography, imagery, well log, and property information, Ecology's well log viewer database, the Washington State Department of Health (DOH) Sentry Internet for water system data, and DOH Source Water Assessment Program (SWAP) Maps. We have also made multiple visits to the site.**

3. *Hydrologic Assessment Required. For all proposed activities to be located in a critical aquifer recharge area, a critical aquifer recharge area report shall contain a level one hydrological assessment. A level two hydrogeologic assessment shall be required for any of the following proposed activities:*

    a. *Activities that result in 5,000 square feet or more impervious site area.* **The proposed development will result in more than 5,000 square feet of impervious surface area but will not create additional impervious surface area above that currently on the site.**

    b. *Activities that divert, alter, or reduce the flow of surface or groundwaters, including dewatering or otherwise reduce the recharging of the aquifer.* **Temporary construction dewatering, if necessary, would be limited to localized excavations such as for elevator pits, and only if the dewatering takes place during flood stages of the Sammamish River. Otherwise, the groundwater level is expected to be several feet below the planned bottom of excavation level. The runoff from the proposed development will be collected and conveyed through a typical water quality treatment facility and then infiltrated through the proposed infiltration trench along the east side of the site. There is currently no onsite infiltration of stormwater. Under the proposed condition, infiltration of treated stormwater will provide recharge to the Redmond Alluvial Aquifer. Water and sewer service for the project is being provided by the City of Redmond. There is no long-term groundwater withdrawal related to the existing site or the proposed improvements. We conclude that, with BMPs and mitigation measures, there will be no project-related effects on nearby wells and surface water features.**

    c. *The storage, handling, treatment, use, production, recycling, or disposal of deleterious substances or hazardous materials, other than household chemicals used according to the directions specified on the packaging for domestic applications.* **The project is a residential development, therefore, the use of deleterious substances or hazardous materials, other than household chemicals, is not anticipated for the site.**

    d. *The use of injection wells, including on-site septic systems, except those domestic septic systems releasing less than 14,500 gallons of effluent per day and that are limited to a maximum density*

of one system per one acre. **The development will be connected to the City sewer system, avoiding the use of on-site septic systems. Injection wells are not a part of the proposed project.**

e. *Any other activity determined by the Technical Committee likely to have an adverse impact on groundwater quality or quantity, or on the recharge of the aquifer.*

4. *Written Level One Hydrogeologic Assessment.* **The responses provided below are intended to satisfy the reporting requirements listed in this section for a written Level One Hydrogeologic Assessment. A level-one hydrogeologic assessment shall include the following site and proposal-related information at a minimum:**

   a. *Information regarding geologic and hydrogeologic characteristics of the site, including the surface location of all critical aquifer recharge areas located on-site or immediately adjacent to the site, and permeability of the unsaturated zone.* **The location of the site relative to the City's CARAs is shown on Figure 3. The surficial geology at and in the vicinity of the project site is described above under "Site Description." The permeability of the unsaturated zone within the alluvium is relatively high.**

   b. *Groundwater depth, flow direction, and gradient based on available information.* **The depth to groundwater at the site has been measured at about 18 to 20 feet in June 2018 and March 2019. Groundwater levels are expected to be higher during flood stages of the Sammamish River (about Elevation 35 to 32 feet). The groundwater flow direction is to the north and northwest to the Sammamish River, and the gradient is about 0.04. Historical groundwater level data from a nearby City monitoring well (MW-327) located southeast of the intersection of Leary Way NE and 150th Place NE indicates the highest groundwater elevation during the period from 2000 through 2014 was approximately Elevation 30 feet. (This ground water elevation will be used as the design seasonal high groundwater level for the infiltration facility to be located along the east side of the site.)**

   c. *Currently available data on wells and springs within 1,300 feet of the project area.* **A summary of water supply wells identified within 1,300 feet of the site is described above under "Water Well Logs." Well locations are shown on Figure 4. No Group A water systems and no springs were identified within the search radius. Based on the available data, the project site does not lie within the 150-foot sanitary control radius of any off-site domestic wells. It is our opinion that none of the wells within 1,300 feet of the site will be adversely impacted by the proposed development since the proposal is protective of groundwater quality by treating all stormwater from design-level storm events before it will be infiltrated. It is also likely that the identified wells no longer exist due to redevelopment of the downtown area and readily available drinking water from the City of Redmond.**

   d. *Location of other critical areas, including surface waters, within 1,300 feet of the project site.* **Surface waters in the area include the Sammamish River located about 200 feet west of the site, as shown on Figure 1. The site is also mapped within a Seismic Hazard Area, but not within or near mapped Landslide or Erosion Hazard Areas.**

   e. *Available historic water quality data for the area to be affected by the proposed activity.* **King County iMAP and DOH water quality records were searched to identify any water quality information for wells within 1,300 feet of the project boundary. No off-site water quality data were identified within the search radius. In addition, none of the wells identified within the search radius would be impacted by the project because the proposal is protective of**

groundwater quality by treating stormwater from design-level storm events before it will be infiltrated. It is also likely that the identified wells no longer exist due to redevelopment of parcels in the area of the wells. Our companion Due Diligence report, presented in Appendix C, summarizes evidence of arsenic concentrations in groundwater on site that exceed the Model Toxics Control Act (MTCA) Cleanup Level (GeoEngineers 2019c). However, the Redmond Alluvial Aquifer is known to have relatively high concentrations of naturally occurring arsenic. We are continuing to monitor groundwater quality at the site on a quarterly basis.

f. *Best management practices proposed to be utilized.* **Project stormwater control and pretreatment components will be designed by DCI Engineers, Inc. implementing appropriate BMPs as previously described.**

5. *Written Level Two Hydrogeologic Assessment.* **The responses provided below are intended to satisfy the reporting requirements listed in this section for a written Level Two Hydrogeologic Assessment.** *A level two hydrogeologic assessment shall include the following site and proposal-related information at a minimum, in addition to the requirements for a level one hydrogeological assessment:*

   a. *Historic water quality and elevation data for the area to be affected by the proposed activity compiled for at least the previous five-year period.* **Available water elevation data from well logs found within 1,300 feet of the project site is summarized in Table 1 above. Historic water quality data for off-site wells was not available. Groundwater was encountered in the on-site explorations and monitoring wells on site within about 18 to 20 feet of the existing ground surface, based on measurements made in late June 2018 and March 1, 2019. We expect the groundwater level will rise in response to seasonal precipitation and flood stages of the river and could be as high as 7 to 10 feet below the ground surface during flood stage. Historical groundwater level data from a nearby City monitoring well (MW 327) located southeast of the intersection of Leary Way NE and 150th Place NE indicates the highest groundwater elevation during the period from 2000 through 2014 was approximately Elevation 30 feet. (This ground water elevation will be used as the design seasonal high groundwater level for the infiltration facility to be located along the east side of the site.) On-site water level monitoring is currently underway. Historic on-site water quality data indicates arsenic in groundwater at levels above MTCA Cleanup Levels (GeoEngineers 2019c). Quarterly on-site water sampling is currently underway.**

   b. *Groundwater monitoring plan provisions.* **Groundwater level measurements and quarterly water quality sampling in on-site monitoring wells are currently underway and will continue until mid-2020.**

   c. *Discussion of the effects of the proposed project on the groundwater quality and quantity, including:*

      i. *Predictive evaluation of groundwater withdrawal effects on nearby wells and surface water features.* **Water and sewer service for the site is provided by the City of Redmond. There is no groundwater withdrawal related to the existing site or for the proposed project. There is no evidence that groundwater levels will be adversely impacted by the proposed development. Therefore, there will be no project-related groundwater withdrawal effects on nearby wells and surface water features.**

ii. *Predictive evaluation of contaminant transport based on potential releases to groundwater.* **Contaminant transport related to potential releases to groundwater is not anticipated for this project. The type of elevator planned for this project is a traction type. In the event a hydraulic elevator is selected instead, secondary containment is to be provided and non-toxic fluids will be used to meet RZC 21.64.050 and RMC 15.24.095 code requirements.**

iii. *Predictive evaluation of groundwater (recharge, elevation, dewatering feasibility, constructability, discharge permitting, etc.) on the proposed project.* **The proposed project will avoid significant adverse impacts to downgradient water resources by implementing required stormwater management controls. Modern stormwater management controls are considered BMPs for keeping surface water flows at natural levels, maintaining groundwater recharge, and mitigating water quality impacts to surface water and groundwater. For example, stormwater from impervious surfaces will be treated and routed to the infiltration trench to recharge the alluvial aquifer. Treated overflow will be conveyed to off-site stormwater facilities and/or surface water. Under the existing condition all precipitation currently runs off the site (approximately 2.33 acre-feet [ac-ft] of runoff). Under the proposed condition, the annual volume of precipitation is 2.09 ac-ft; 2.01 ac-ft will be infiltrated and 0.08 ac-ft will run off (DCI Engineers personal communication 2019). With appropriate mitigation, we anticipate no direct impact to groundwater associated with the proposed development.**

d. *Identification of the type and quantities of any deleterious substances or hazardous materials that will be stored, handled, treated, used, produced, recycled, or disposed of on the site, including but not limited to materials, such as elevator lift/hydraulic fluid, hazardous materials used during construction, materials used by the building occupants, proposed storage and manufacturing uses, etc.* **The project is a proposed multi-story residential development; therefore, quantities of deleterious substances and hazardous materials are unlikely to exceed standard household quantities. It is possible that during construction the contractor may have hazardous materials on site associated with their equipment. Planned construction activities will follow the site SWPPP to be prepared by DCI Engineers, Inc. The type of elevator planned for this project is a traction type. In the event a hydraulic elevator is selected instead, secondary containment is to be provided and non-toxic fluids will be used to meet RZC 21.64.050 and RMC 15.24.095 code requirements.**

e. *Proposed methods of storing any of the above substances, including containment methods to be used during construction and/or use of the proposed facility.* **This will be addressed in the site SWPPP to be prepared by DCI Engineers, Inc.**

f. *Proposed plan for implementing RZC 21.64.050.D.3.f, Protection Standards During Construction.* **This will be addressed in the site SWPPP to be prepared by DCI Engineers, Inc.**

g. *A spill plan that identifies equipment and/or structures that could fail, resulting in an impact. Spill plans shall include provisions for regular inspection, repair, and replacement of structures and equipment that could fail.* **This will be addressed in the site SWPPP to be prepared by DCI Engineers, Inc.**

h. *A complete discussion of past environmental investigations, sampling, spill or incidents that may have resulted in or contributed to contaminated soils or groundwater at the site. Attach*

copies of all historical and current reports, and sampling results. **A copy of our due diligence report for this project, which includes a discussion on past environmental evaluations of the site, is included as Appendix C (GeoEngineers 2019c). Reports of Phase I and Phase II ESAs completed by others for the site are available on request.**

6.0 LIMITATIONS

We have prepared this report for use by G.W. Williams Co., Cleverly Development Consulting, and their authorized agents in the permitting and design phase of The Osprey residential development project to be located at 7440 159th Place NE in Redmond, Washington.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of hydrogeology in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Please refer to Appendix D, Report Limitations and Guidelines for Use, for additional information pertaining to use of this report.

7.0 REFERENCES

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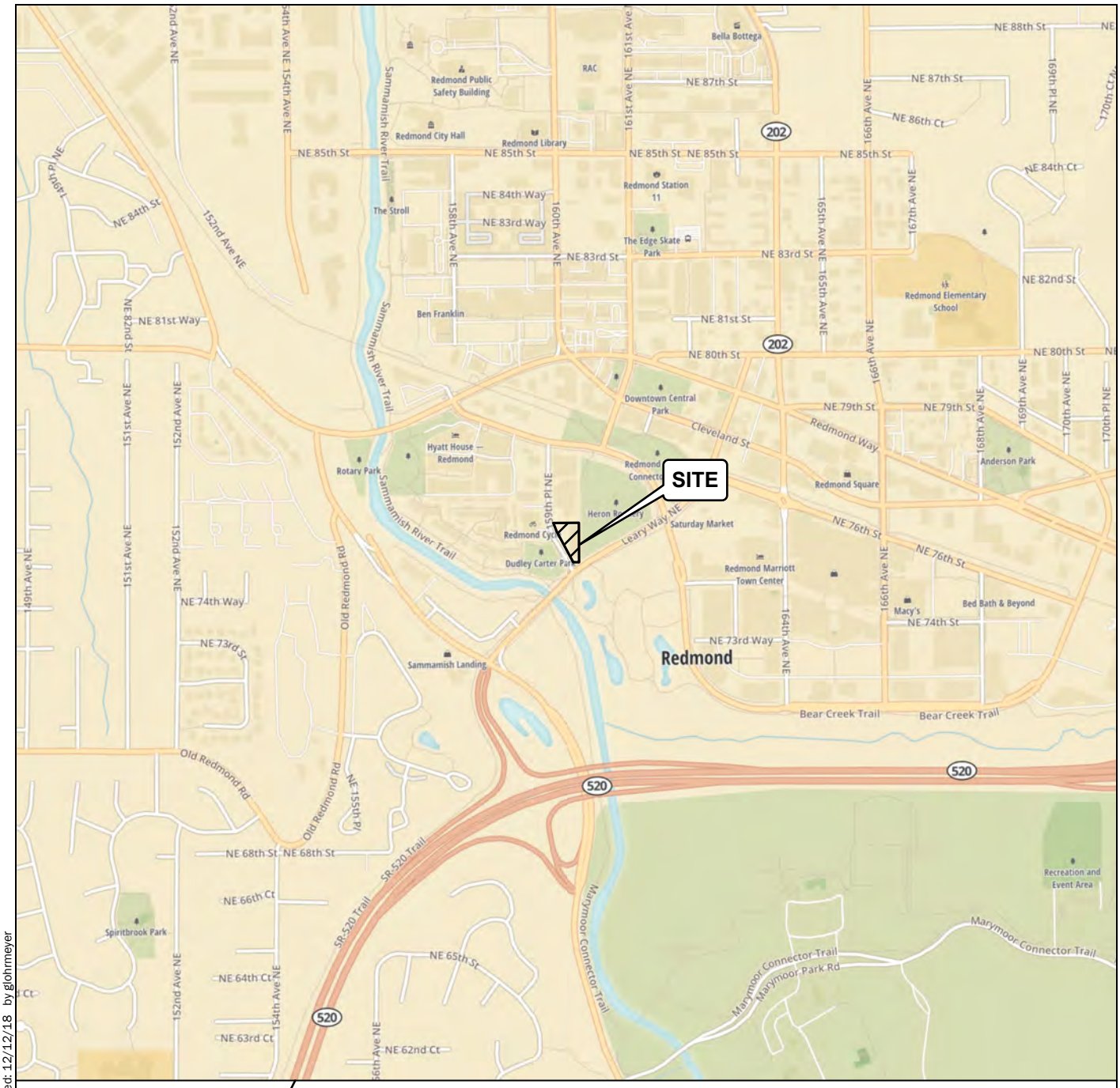
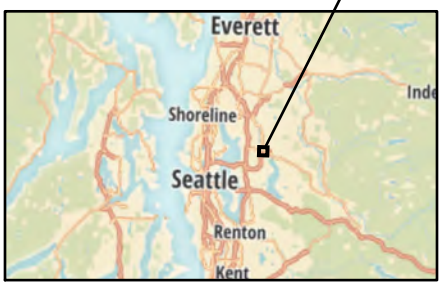
FIGURES

GeoEngineers





N
W E
S

1,000 0 1,000

Feet

Vicinity Map

Proposed Residential Development
Redmond, Washington

GeoEngineers

Figure 1

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Mapbox Open Street Map, 2018

Projection: NAD 1983 UTM Zone 10N

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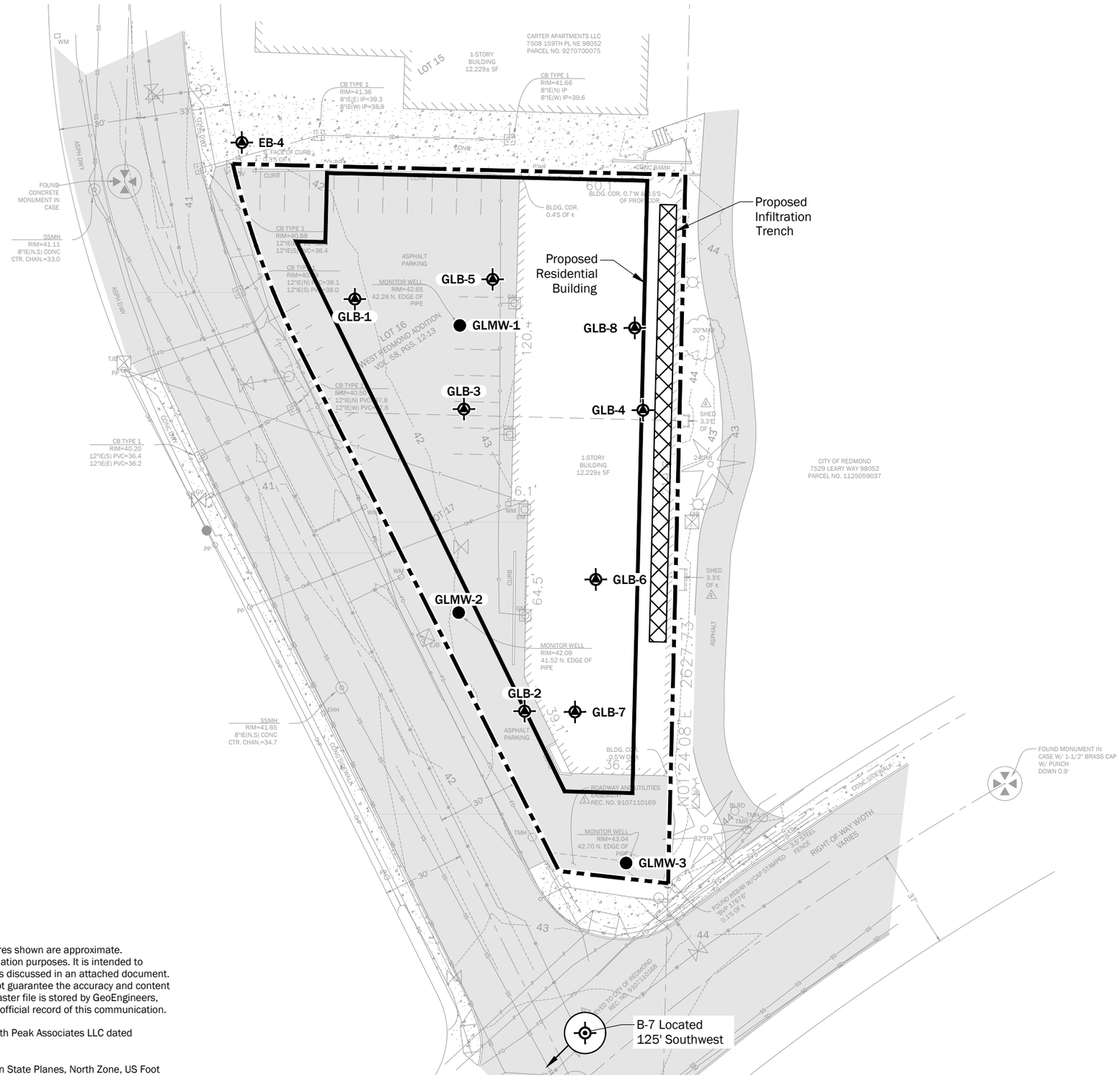

Legend

- Property Boundary
- B-7 — Boring by GeoEngineers (1998)
- GLMW-1 — Monitoring Well by Others
- GLB-1 — Direct Push Boring by Others

N

W E

S

40 0 40

Feet

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Survey from North Peak Associates LLC dated 12/26/2018.

Projection: NAD83 Washington State Planes, North Zone, US Foot

Site Plan

Proposed Residential Development
Redmond, Washington

GeoEngineers

Figure 2

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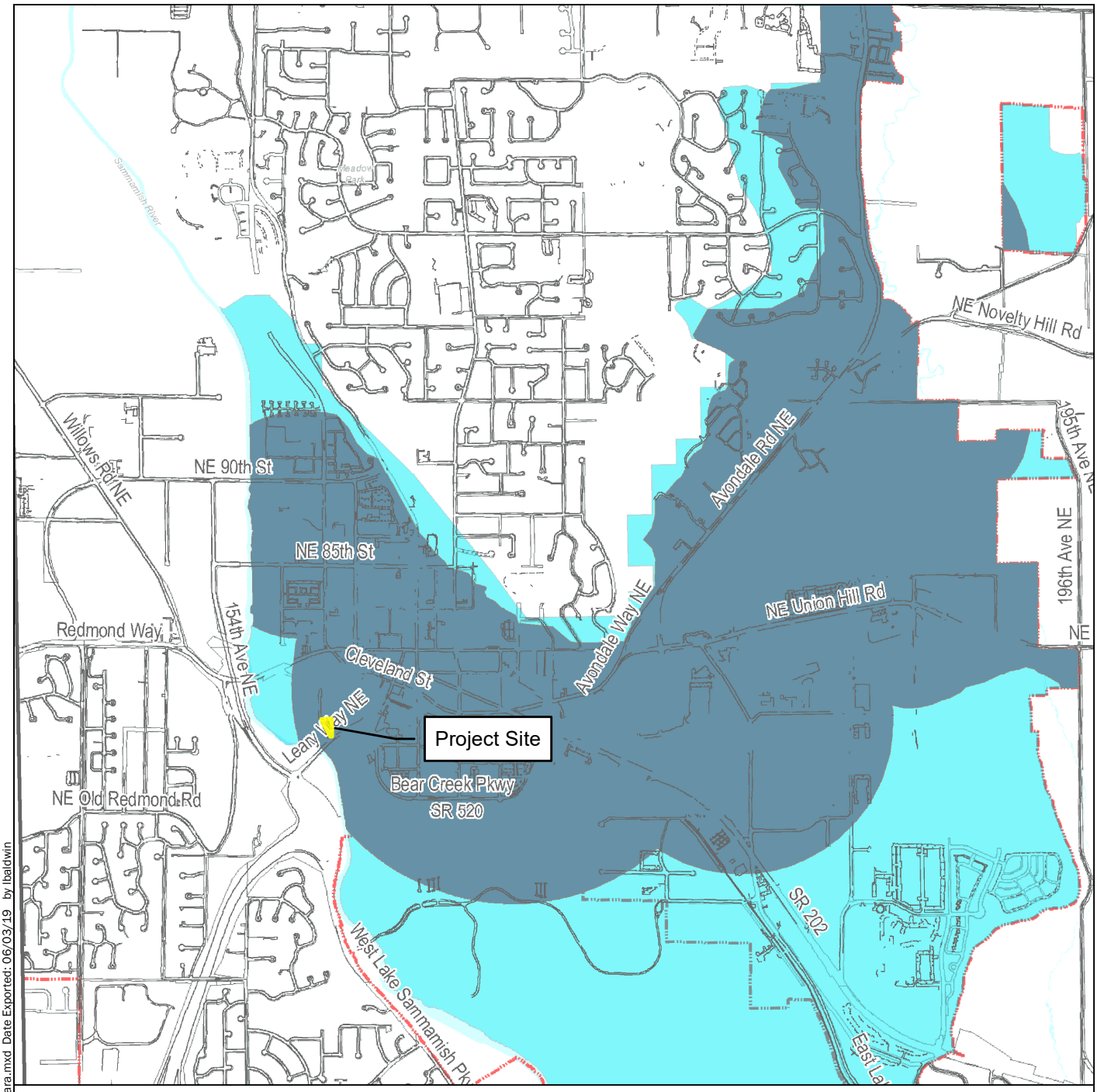

Legend

- Site Parcel
- City Limit
- CARA I
- CARA II

3,500 0 3,500

Feet

N W E S

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: CARA data from King County online iMAP

Projection: WGS 1984 Web Mercator Auxiliary Sphere

Critical Aquifer Recharge Areas

Proposed Residential Development
Redmond, Washington

GeoEngineers

Figure 3

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Legend

- Site
- 1,300 ft Site Buffer
- Ecology Water Well
- King County iMAP Water Well

700 0 700

Feet

N

W E

S

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Well location data from King County online iMAP

Projection: WGS 1984 Web Mercator Auxiliary Sphere

Water Well Locations

Proposed Residential Development
Redmond, Washington

GeoEngineers

Figure 4

\\geoengineers.com\WAN\Projects\23\23699001\GIS\2369900101_F04_Wells.mxd Date Exported: 06/03/19 by lbaldwin

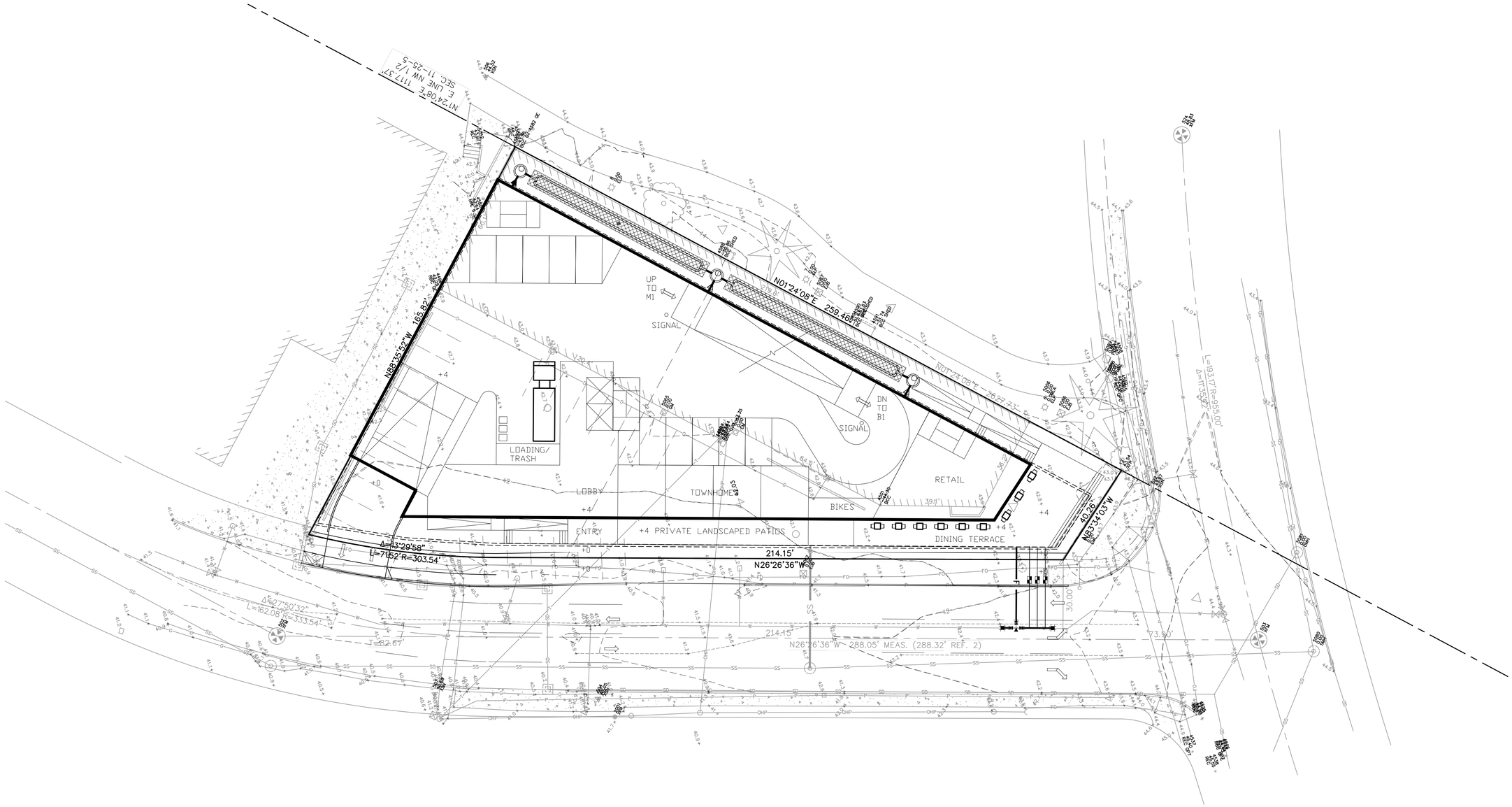


Figure 5

GRAPHIC SCALE
20 0 10 20
(IN FEET)
1 inch = 20 ft.

811 Know what's below. Call before you dig.

APPROVED FOR CONSTRUCTION

FOR: Director of Public Works
City of Redmond

Date: _____

Plan Chk Engr: _____
Storm: _____
Utility: _____
Fire: _____
Trans / Engr: _____
Planning: _____

This approval is for the design concept only. These plans appear to be in conformance with the City Of Redmond design standards for construction. This approval shall not be construed as authorizing construction not in accordance with applicable City standards. The City reserves the right to require revisions to the approved plans to assure conformance with City of Redmond design standards for construction at any time that it is discovered that the proposed construction does not otherwise meet the applicable construction standards. The owner is required to provide designs and plans in accordance with applicable City standards and assures that construction is accomplished in accordance with those standards. The owner and/or design engineer and/or developer may be required to make necessary approved field revisions to correct any errors or omissions found on the approved plan.

PREPARED BY:
DCI ENGINEERS
818 STEWART STREET • SUITE 1000
SEATTLE, WASHINGTON 98101
PHONE: (206) 332-1900 • FAX: (206) 332-1600
WEBSITE: www.dci-engineers.com
CIVIL / STRUCTURAL AND TRAFFIC ENGINEERING

SIGNATURE:
NORREN A. SLAMPSON
STATE OF WASHINGTON
REGISTERED PROFESSIONAL ENGINEER
27856
2/7/2019

REVISIONS:

APPROVALS:
Job No.: 19012-0002
Proj. Manager: DAS
Designed: _____
Reviewed: C. DYER
Drawn: _____
Dwg. Checked: _____
Scale: 1" = 20'

PROJECT TITLE:
EVAN'S AUTO
7440 159TH PL NE 98052
REDMOND, WA

SHEET TITLE:

SHEET NO.
C-1

SECTION __, TOWNSHIP __ NORTH, RANGE __ EAST, W.M.

Plot Date: 2019-03-20 File Location: O:\9120-Seattle\Dcs-Civil\2019\19012-0002-Evans\Autocivil\dwg\19002_PLN.dwg

APPENDICES

GeoEngineers

APPENDIX A
Previous Explorations

APPENDIX A
PREVIOUS EXPLORATIONS

This appendix presents logs of selected borings completed by GeoEngineers in 1988 and by others in 2014 and 2018 within and near the project site.

The approximate locations of the previous borings are shown on the Site Plan, Figure 2.

BORING NO. 7

Depth (feet)	Lab Tests	Moisture Content	Dry Density	Blow-Count	Samples	Group Symbol	DESCRIPTION (Approximate Elevation: 41 feet)
0							7 INCHES OF ASPHALTIC CONCRETE
	MD	3.0%	127	20	■	SM	REDDISH-BROWN SILTY FINE TO MEDIUM SAND WITH GRAVEL AND OCCASIONAL CRUSHED ROCK AND COBBLES (MEDIUM DENSE, DRY TO MOIST) (FILL)
				14	■		
5						SP	BROWN FINE TO MEDIUM SAND WITH GRAVEL (MEDIUM DENSE, MOIST) (FILL)
				29	■	SM	DARK BROWN SILTY FINE SAND WITH GRAVEL AND A TRACE OF ORGANIC MATTER AND OCCASIONAL COBBLES (MEDIUM DENSE, DRY) (FILL)
10							
	MD	2.5%	117	25	■	SP	BROWN FINE TO MEDIUM SAND WITH A TRACE OF COARSE SAND AND GRAVEL (MEDIUM DENSE, MOIST)
15							
	MD, DS	3.7%	105	18	■		
20						SW	BROWN FINE TO COARSE SAND WITH A TRACE OF SILT AND GRAVEL, AND OCCASIONAL COBBLES (MEDIUM DENSE, WET)
	MD	11.0%	127	19	■		
25							
				24	■		
30						SW	GRAY FINE TO COARSE SAND WITH GRAVEL (MEDIUM DENSE TO DENSE, WET)
	MD, DS	10.0%	130	34	■		
35							
	M, GS	6.8%		37	■		
40							

DEPTH IN FEET

TEST DATA

Note: See Figure A-2 for Explanation of Symbols

GeoEngineers Incorporated

LOG OF BORING

FIGURE A-10

BORING NO. 7 (Continued)

DEPTH IN FEET	TEST DATA: Lab Tests	Moisture Content	Dry Density	Blow-Count	Samples	Group Symbol	DESCRIPTION
40						SP	GRAY FINE TO MEDIUM SAND (MEDIUM DENSE, WET)
	MD, DS	18.0%	104	20	■	SW	GRAY FINE TO COARSE SAND WITH GRAVEL AND OCCASIONAL COBBLES (MEDIUM DENSE, WET)
45						SP	GRAY FINE TO MEDIUM SAND WITH A TRACE OF SILT (DENSE, WET)
	MD	8.3%	135	41	■		
50							BORING COMPLETED AT 49.0 FEET ON 3/10/88
							GROUND WATER NOTED AT A DEPTH OF ABOUT 21 FEET DURING DRILLING

Note: See Figure A-2 for Explanation of Symbols

GeoEngineers Incorporated

LOG OF BORING

FIGURE A-11

Associated Earth Sciences, Inc.

Exploration Log

Project Number	Exploration Number	Sheet
KE140132A	EB-4	1 of 1

Project Name	Queen City Auto	Ground Surface Elevation (ft)	
Location	Redmond, WA	Datum	N/A
Driller/Equipment	Geologic Drill / XL Rig	Date Start/Finish	3/31/14,3/31/14
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Asphalt - 2 inches					
				Quaternary Younger Alluvium					
		S-1		Medium dense, moist, brown, medium sandy fractured GRAVEL, few fine sand, few silt; stratified (~3 inches thick) (GP-GM).			11 12 13	▲25	
5		S-2		Medium dense, moist to very moist, brown, fine to medium SAND, little fractured gravel, trace coarse sand, few silt; stratified to thinly stratified (SM-SP).			9 11 13	▲24	
		S-3		Very dense, slightly moist, brown to dark brown, fine to medium SAND, with gravel, trace coarse sand, few to little silt; faintly stratified (SM-SP).			15 18 32	▲50	
10		S-4		Very dense, slightly moist to moist, brown, fine to medium SAND, little gravel, trace coarse sand, few to little silt; faintly stratified (SM-SP).			21 44 25	▲69	
						▼			
15		S-5		Medium dense, wet, brown, fine to medium SAND, with fine gravel, few coarse sand, few silt; faintly stratified (~4 inches thick) (SM-SP).			14 13 12	▲25	
20		S-6		6 inch sample; 7 inches heave. Very dense, wet, brown, gravelly fine to medium SAND, trace coarse sand, few silt; massive (SM-SP).			50/6"	▲50/6"	
25		S-7		9 inch sample; 12 inches heave. Very dense, wet, grayish brown, GRAVEL, with medium to coarse sand, trace fine sand, trace silt; massive (GP).			24 34 33	▲67	
				Bottom of exploration boring at 26.5 feet Blow counts are likely overstated due to high gravel content of soils. Soil densities likely range from loose to medium dense.					
30									
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: DMG

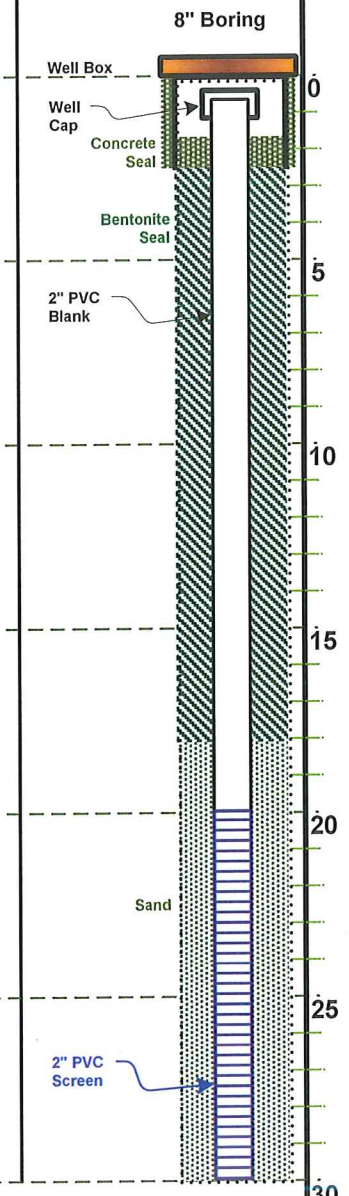
Approved by:

AESIBOR 140132.GPJ April 10, 2014

glmw-1 1.vsd

Depth	BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)
0	16 21 25			No Recovery at 2.5'			
5	10 14 15		GLMW-1-5	5-6.5': SAND, medium to coarse grained with fine to coarse gravel, brown, dry, no odor.	5	SW	0.0
10	18 24 16		GLMW-1-10	10-11.5': SAND, medium to coarse grained with fine to coarse gravel, brown, dry, no odor.	30	SW	0.0
15	18 29 27		GLMW-1-15	15-16.5': SAND, medium to coarse grained with fine to coarse gravel, brown, dry, no odor.	20	SW	0.1
20	50/3		GLMW-1-20	20-21.5': SAND, coarse grained with fine to coarse gravel, brown, wet, no odor.	60	SW	0.1
25	8 40 50/3		GLMW-1-25	25-25.75': SAND, coarse grained with fine to coarse gravel, brown, wet, no odor. 25.75-26.5': SAND, fine grained with trace silt, brown, moist to wet, no odor.	100	SW SP	0.1
30	Depth in feet						

WELL CONSTRUCTION



Drilling Method: Hollow-stem auger	Date: 6/19/2018	Other Information: Well Tag BKZ-663
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 1 of 2	
Logged By: H. Carter		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLMW-1

glmw-1 2.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
							8" Boring
8 14 50/6		GLMW-1-30	30-30.75': GRAVEL with trace medium grained sand, brown, moist to wet, no odor. 30.75-31.5': SAND, fine grained with trace silt, brown, moist to wet, no odor.	100	GW SP	0.0	Bentonite Backfill
8 32 50/4		GLMW-1-35	35-36.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to wet, no odor.	100	SW	0.1	
7 21 28		GLMW-1-40	40-41.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to wet, no odor.	100	SW	0.1	

30 35 40 45 50 55 60

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/19/2018	Other Information: Well Tag BKZ-664
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 2 of 2	
Logged By: H. Carter		

g-logics

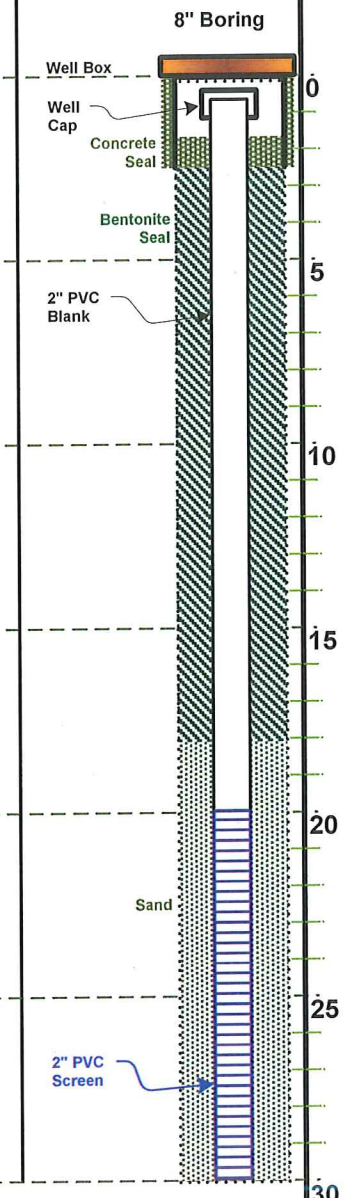
Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLMW-1

glmw-2 1.vsd

Depth	BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)
0							
5	5 14 13		GLMW-2-5	5-6.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist, no odor.	40	SW	0.0
10	6 11 11		GLMW-2-10	10-11.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist, no odor.	30	SW	0.1
15	15 28 30		GLMW-2-15	15-16.5': SAND, medium to coarse grained with fine to coarse gravel, brown, dry, no odor.	40	SW	0.0
20	24 50/4		GLMW-2-20	20-21.5': SAND, coarse grained with fine to coarse gravel, brown, wet, no odor. Very thin layer of silty sand at 21.5'.	20	SW	0.1
25	20 50/3		GLMW-2-25	25-26.5': SAND, fine to medium grained with trace gravel, brown, wet, no odor.	70	SP	0.0
30	Depth in feet						

WELL CONSTRUCTION



Drilling Method: Hollow-stem auger	Date: 6/19/2018	Other Information: Well Tag BKZ-664
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 1 of 2	
Logged By: H. Carter		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLMW-2

glmw-2 2.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
							8" Boring
30 3 15 27		GLMW-2-30	30-31.5': SAND, fine to medium grained with trace gravel, brown, moist to wet, no odor.	100	SP	0.0	Bentonite Backfill
35 11 14 18		GLMW-2-35	35-36.5': SAND, medium grained with trace gravel, brown, moist to wet, no odor.	90	SP	0.1	
40 3 9 13		GLMW-2-40	40-41.5': SAND, medium grained with trace gravel, brown, wet, no odor.	30	SP	0.1	
45							
50							
55							
60							

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/19/2018	Other Information: Well Tag BKZ-664
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 2 of 2	
Logged By: H. Carter		

g-logics

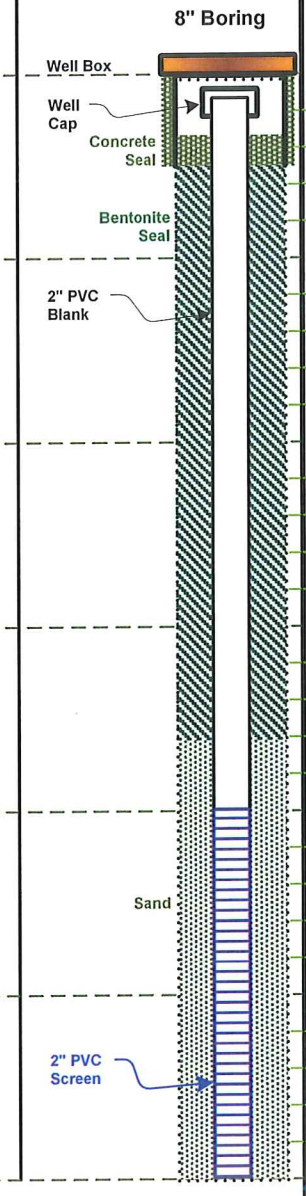
Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLMW-2

glmw-3 1.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)
2 4 4		GLMW-3-2.5	2.5-4': SAND, fine grained with fine gravel, brown, dry, slight petroleum odor, woodchips at 4'.	10	SW	6.1
12 18 14		GLMW-3-5	5-6.5': SAND, fine grained with fine to coarse gravel, brown, dry, no odor.	15	SW	2.8
10 37 10		GLMW-3-10	10-11.5': SAND, medium grained with fine to coarse gravel, brown, moist to dry, no odor.	50	SW	0.3
20 40 41		GLMW-3-15	15-16.5': SAND, medium grained with fine to coarse gravel, brown, moist to dry, no odor.	60	SW	0.1
34 17 19		GLMW-3-20	20-21.5': SAND, medium grained with fine to coarse gravel, brown, wet, no odor.	10	SW	0.0
2 8 32		GLMW-3-25	25-26.5': SAND, fine to medium grained with trace gravel, gray brown, moist, no odor.	100	SP	0.1

WELL CONSTRUCTION



Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information: Well Tag BKZ-665	
Drilling Company: Holocene	Weather: Sunny		
Boring Diameter: 8"	Page 1 of 2		
Logged By: H. Carter			

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLMW-3

glmw-3 2.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
							8" Boring
14 50/6		GLMW-3-30	30-31.5': SAND, fine to medium grained with trace gravel, brown, moist to wet, no odor.	100	SP	0.0	Bentonite Backfill
6 17 47		GLMW-3-35	35-36.5': SAND, medium grained with trace gravel, brown, moist to wet, no odor.	100	SP	0.0	
6 17 32		GLMW-3-40	40-41.5': SAND, fine to medium grained with trace gravel, brown, wet, no odor.	90	SP	0.0	

30 35 40 45 50 55 60

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information: Well Tag BKZ-665
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 2 of 2	
Logged By: H. Carter		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLMW-3

glb-1.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
0							Temporary Boring, Backfilled with Bentonite
5 10 11		GLB-1-2.5	2.5-4': SAND, medium to coarse grained with fine to coarse gravel, brown, moist, no odor.	5	SW	0.3	
5 14 16 20		GLB-1-5	5-6.5': SAND, fine grained with fine to coarse gravel, gray brown, dry, no odor.	<5		0.0	
16 50/5		GLB-1-7.5	7.5-9': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	15	SW		
10 8 11 7		GLB-1-10	10-11.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	30	SW	0.0	
15			No Recovery				
20 50/5		GLB-1-20	20-21.5': SAND, coarse grained with fine to coarse gravel, gray brown, wet, no odor.	15	SW	0.1	
25							
30							

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information:
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 1 of 1	
Logged By: H. Carter		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLB-1

glb-2.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
0							Temporary Boring, Backfilled with Bentonite
7 11 6		GLB-2-2.5	2.5-4': SAND, medium grained with fine to coarse gravel, brown, dry, no odor.	10	SW	0.2	
5 7 11 18		GLB-2-5	5-6.5': SAND, medium grained with fine to coarse gravel, brown, dry, no odor.	5	SW	0.3	
			No Recovery				
10 13 17 12		GLB-2-10	10-11.5': SAND, fine to medium grained with fine to coarse gravel, brown, dry, no odor.	5	SW	0.3	
15 10 19 19		GLB-2-15	10-11.5': SAND, fine to medium grained with fine to coarse gravel, brown, dry, no odor.	40	SW	0.4	
20 10 7 4		GLB-2-20	20-21.5': SAND, fine to medium grained with fine to coarse gravel, brown, wet, no odor.	10	SW	0.3	
25							
30							

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information:
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 1 of 1	
Logged By: H. Carter		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLB-2

glb-3.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-4': SAND, very fine to fine grained with fine to coarse gravel and silt, brown, moist, no odor.		SW		Temporary Boring, Backfilled with Bentonite
		GLB-3-4		20		0.0	
			4-19': SAND, medium grained with fine to coarse gravel, brown, dry, no odor.				
		GLB-3-8		15	SW	0.0	
		GLB-3-12		15	SW	0.0	
		GLB-3-16		20	SW	0.0	
		GLB-3-20	19-24': SAND, medium to coarse grained with fine to coarse gravel and trace silt, brown, wet, no odor.	60 ▽		0.0	
		GLB-3-24		70	SW ▽	0.0	

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/19/2018	Other Information:
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 2"	Page 1 of 1	
Logged By: H. Carter		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLB-3

glb-4.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-9': SAND, very fine to fine grained with fine to coarse gravel and silt, light brown, dry, no odor.		SW		Temporary Boring, Backfilled with Bentonite
		GLB-4-5		70		0.0	
		GLB-4-9	9-12': SAND, very fine to fine grained with fine to coarse gravel and silt, red, dry, slight petroleum odor.	60	SW	0.0	
		GLB-4-12	12-16': SAND, very fine to fine grained with fine to coarse gravel and silt, light brown, dry, no odor.	30	SW	0.0	
		GLB-4-16	16-19': SAND, fine grained with fine to coarse gravel and trace silt, red, dry, no odor.	30	SW	0.2	
		GLB-4-19		40	▽	0.6	

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/19/2018
Drilling Company: Holocene	Weather: Sunny
Boring Diameter: 2"	Page 1 of 1
Logged By: H. Carter	

Other Information:
Drill tip stuck in ground at 10'. Had to move hole and re-drill.

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLB-4

glb-5.vsd

Depth	BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
0								Temporary Boring, Backfilled with Bentonite
				No Recovery				
5	6 7 9		GLB-5-5	5-6.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	10		0.0	
	11 50/6		GLB-5-7.5	7.5-9': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	5	SW	0.0	
10	14 19 12		GLB-5-10	10-11.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	5	SW	0.0	
15	4 12 19		GLB-5-15	10-11.5': SAND, fine to medium grained with trace silt, brown, moist to dry, no odor.	40	SP	0.0	
20	22 50/3		GLB-5-20	20-21.5': SAND, medium to coarse grained with fine to coarse gravel, brown, wet, no odor.	10	SW	0.0	
25								
30								

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information:	
Drilling Company: Holocene	Weather: Sunny		
Boring Diameter: 8"	Page 1 of 1		
Logged By: H. Carter			

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLB-5

glb-6.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-2.5': SAND, fine grained with silt and occasional gravel, brown, dry, no odor.				Temporary Boring, Backfilled with Bentonite
		GLB-6-2.5	2.5-13': SAND, medium to coarse grained with fine to coarse gravel and silt, brown, dry to moist, no odor.	30	SW	0.0	
		GLB-6-7.5		50	SW	0.0	
		GLB-6-10				0.0	
		GLB-6-13	13-15': SAND, coarse grained with silt and trace gravel, brown, slightly moist, no odor.	100	SP	0.0	
			15-20': SAND, medium to coarse grained with fine to coarse gravel, brown, dry to wet (20'), no odor.		SW		
		GLB-6-20		40		0.0	

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/26/2018	Other Information:
Drilling Company: Holocene	Weather: Cloudy	
Boring Diameter: 2"	Page 1 of 1	
Logged By: Z. Wall		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLB-6

glb-7.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-10': SAND, fine grained with silt and trace gravel, brown, dry, no odor.		SW		Temporary Boring, Backfilled with Bentonite
		GLB-7-5		5		0.0	
					SW		
		GLB-7-10		5		0.8	
			10-15': SAND, fine to coarse grained with fine to coarse gravel, brown, slightly moist, no odor.		SW		
		GLB-7-15		75		0.0	
			15-23': SAND, medium to coarse grained with fine to coarse gravel and silt, brown, dry to slightly moist, no odor.		SW		
		GLB-7-20		100		0.0	
		GLB-7-23	23-25': SAND, coarse grained with fine to coarse gravel, brown, wet, no odor.	▽	SW	0.0	
				100	▽		

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/26/2018	Other Information:
Drilling Company: Holocene	Weather: Cloudy	
Boring Diameter: 2"	Page 1 of 1	
Logged By: Z. Wall		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLB-7

glb-8.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-5': SAND, fine to medium grained with silt, Gravel, and wood, brown, dry, no odor.		SW		Temporary Boring, Backfilled with Bentonite
		GLB-8-5		5		0.0	
			5-8': GRAVEL, fine to coarse grained with sand and silt, light brown, dry, no odor.		GW		
		GLB-8-10	8-10': SAND, fine to coarse grained with fine to coarse gravel, brown, dry, no odor.	5		0.0	
			No Recovery	75	SW		
			No Recovery	100	SW		
		GLB-8-20	23-25': SAND, fine to medium grained with fine to coarse gravel, brown, dry, no odor.		SW	0.0	
		GLB-8-25		100	▽	0.0	

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/26/2018	Other Information:
Drilling Company: Holocene	Weather: Cloudy	
Boring Diameter: 2"	Page 1 of 1	
Logged By: Z. Wall		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLB-8

APPENDIX B
Water Well Logs

25
-1.80
23.20

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION

WELL SCHEDULE No. 25/5E-11G1

Date Oct 28, 1969

Record by Dyson

Source King Co & obs

DIAGRAM OF SECTION

Location: State of WASHINGTON

County King

Area Redmond

Map Kirkland 7½

¼ ¼ sec. T. N., R. E. W.

Details Immed behind res.

6" casing in 18" casing

Owner Shoemaker & Tennant, Jessup (His No.)

Address

Driller Address

Topography

Land-surface datum 43 ft. above below USCE

Type: Dug Drilled Driven Bored Jetted

Depth: Rept. 76/23 feet

Meas. -1.32 feet

Date Sep, 1969

Casing: Diam. 6 & 18 to in. ft. Type Std & concrete

Depth ft. Finish

Chief aquifer Depth ft. Thick ft.

Water level: Rept. 23.20 ft. 10-28, 1969, above below

Meas. (dry well dry)

which is 1.32 ft. above (below) datum

Pump: Type J Capacity Size gal. min.

Driven by 1 horsepower

Yield: Flow gal. min. Pump gal. min. Meas. Rept. Est.

Drawdown ft. after hours pumping gal. min.

Adequacy, permanence Good

Use: (Dom.) Stock. PS. RR. Ind. Irr. Obs.

Quality: Sample No. , 19 Temp. °F.

Taste, color, hardness, sanitation, etc. Bad Fe & Mn (?) after 5 hrs.

Other data: Log Water levels Draft Pump test Analyses

Turn up

SP-15529

APPENDIX C
Previous Due Diligence Report

Geotechnical Engineering, Hydrogeologic and Environmental Services

Due Diligence Phase
Proposed Residential Development
King County Tax Parcel 9270700080
7440 159th Place NE
Redmond, Washington

for
G.W. Williams Co. and Cleverly Development Consulting

March 14, 2019

GeoEngineers
Earth Science + Technology

Geotechnical Engineering, Hydrogeologic and Environmental Services

Due Diligence Phase
Proposed Residential Development
King County Tax Parcel 9270700080
7440 159th Place NE
Redmond, Washington

for
G.W. Williams Co. and
Cleverly Development Consulting

March 14, 2019

GeoEngineers

17425 NE Union Hill Road, Suite 250
Redmond, Washington 98052
425.861.6000

Geotechnical Engineering, Hydrogeologic and Environmental Services

Due Diligence Phase
Proposed Residential Development
King County Tax Parcel 9270700080
7440 159th Place NE
Redmond, Washington

File No. 23699-001-00

March 14, 2019

Prepared for:

G.W. Williams Co.
3190 Clearview Way, Suite 200
San Mateo, California 94402

Attention: Scott W. Williams

Prepared by:

GeoEngineers, Inc.
17425 NE Union Hill Road, Suite 250
Redmond, Washington 98052
425.861.6000

SHAUN D. STAUFFER
STATE OF WASHINGTON
33250
REGISTERED
PROFESSIONAL ENGINEER
3/14/19

FOR HRP

Herbert R. Pschunder, PE
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Principal

State of Washington
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1964
Licensed Geologist
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Principal

HRP:JR:SDS:MAPK:DLC:nld

cc: Carl Vander Hoek, Cleverly Development Consulting (one copy by email)

Table of Contents

LIST OF FIGURES

APPENDICES

INTRODUCTION

This report presents the results GeoEngineers, Inc.'s (GeoEngineers) geotechnical engineering, hydrogeologic and environmental services in support of the due diligence phase for the proposed residential development on property located at 7440 159th Place NE in Redmond, Washington. The property is identified as King County Tax Parcel Number 9270700080.

The location of the site is shown on the Vicinity Map, Figure 1. The project site is shown in relation to surrounding features on the Site Plan, Figure 2.

Project Description

We understand the property will be redeveloped with a multi-story residential building. No specific layout or building concept has been determined at this time. A one level or partial level below grade parking is being considered for the building.

Purpose and Scope

The purposes of our services are to: (1) provide geotechnical, hydrogeologic and environmental input during the due diligence phase of the project based on available subsurface information obtained by GeoEngineers and others; and (2) identify additional site evaluations, as appropriate, to assist in the design and permitting phases of the project.

Our services were completed in accordance with our proposal dated November 13, 2018. Written authorization to proceed with our services for the due diligence phase was provided by Scott Williams of G.W. Williams Co. on November 30, 2018.

PREVIOUS STUDIES

GeoEngineers completed geotechnical engineering services in 1988 for improvements to Leary Way, which extends along the south side of the site. Several borings were drilled as part of that project, including a boring (B-7) about 125 feet southwest of the intersection of Leary Way and 159th Place NE (see Figure 2).

Associated Earth Sciences, Inc. (AESI) completed geotechnical engineering services for the adjacent properties to the north (7494 and 7500 159th Place NE) which are summarized in a report dated April 18, 2014. Several borings were drilled for that project, including a boring (EB-4) near the northwest corner of the Evans Automotive site.

A Phase II Environmental Site Assessment (ESA) was completed in 2018 by G-Logics, Inc. and summarized in a report dated June 28, 2018. The Phase II ESA included 11 borings, three of which were completed as groundwater monitoring wells (GLMW-1, -2 and -3), with the remaining 8 borings (GLB-1 through GLB-8) being backfilled. The approximate locations of these borings and monitoring wells are shown on Figure 2.

Logs of the previous explorations are included in Appendix A.

SITE DESCRIPTION

Geology

Geologic information for the project vicinity was obtained from the map entitled "Geologic Map of the Kirkland Quadrangle, Washington" (Minard 1983) published by the United States Geological Survey (USGS). The native geologic unit mapped in the site vicinity consists of alluvium.

The alluvium is mapped along and east of the Sammamish River and consists primarily of near-surface organic rich fine sand, silt and clay. Peat layers are often present in the upper few feet of the alluvium. Sand and gravel alluvial deposits underlie the surficial soils.

Fill associated with past grading for existing building and pavement areas mantles the alluvial deposits.

Critical/Sensitive Areas Delineation

Review of the City of Redmond Critical Areas Maps and King County Sensitive Areas Maps indicate the project area is located within Wellhead Protection Zone 3 and within a mapped Seismic Hazard Area. The project area is also within a Critical Aquifer Recharge Area (CARA) in accordance with the City of Redmond Zoning Code Section 20D.140.50.

Surface Conditions

The triangular-shaped property comprises approximately 0.62 acres and is identified as King County Parcel Number 9270700080. Existing site features are shown in Figure 2.

The site is bounded on the north by a recently completed apartment building (The Carter on the Park), on the east by Heron Rookery Park, on the south by Leary Way NE, and on the west by 159th Place NE. The property is owned by G.W. Williams Co. and is currently occupied by automotive facilities (A1 Luxury Motors and Harvey's Auto Service). A one-story automobile repair shop constructed in 1968 occupies the east part of the site. Asphalt paved parking and driveway areas are located in the north and west parts of the site.

The ground surface is generally level. The finished floor of the existing building is at about Elevation 43 feet. (Elevations in this report refer to the North American Vertical Datum of 1988 [NAVD 88].) Surface grades outside the building range from about Elevation 41 to 43 feet. Underground power and fiber optic lines extend along the west edge of the site.

Subsurface Soil Conditions

Based on our review of available subsurface information, the subsurface soils in the vicinity of the site generally consist of fill soils with varying thicknesses overlying medium dense to dense granular alluvial deposits, as discussed below:

- **Pavement and Floor Slab Materials:** Several of the borings were drilled within asphalt paved areas and within the existing building. The thicknesses of the pavement and floor slab were not noted on the boring logs.
- **Fill:** Existing fill was apparently encountered in the upper 5 feet of borings GLMW-3 and GLB-8, based on the presence of wood fragments. The fill layer is described as loose sand with gravel. The remaining boring logs did not note the presence of fill.

- **Granular Alluvium:** Medium dense to dense sand and gravel alluvial deposits were encountered in all of the explorations and extend to the maximum depth explored, 41½ feet.

Groundwater Conditions

Groundwater was encountered in the previous explorations and monitoring wells within about 18 to 20 feet of the existing ground surface. These measurements were made in late June 2018.

This groundwater represents a shallow aquifer within the near surface alluvial soils that is part of the Redmond Alluvial Aquifer underlying the downtown area. This aquifer is in direct hydraulic communication with the Sammamish River, located within 200 feet of the southern end of the site. We expect the groundwater level will rise in response to seasonal precipitation and flood stages of the river and could be as high as 7 to 10 feet below the ground surface during flood stage.

CONCLUSIONS AND RECOMMENDATIONS

Geotechnical and Hydrogeologic Considerations

Based on the previous explorations, analyses and experience on nearby projects in the downtown Redmond area, we conclude the residential project can be satisfactorily completed as planned. Suitable foundation support can consist of shallow foundations placed directly on the medium dense to dense granular alluvial soils, or on a zone of structural fill replacing loose soils that may be encountered at footing subgrade level. A detailed discussion of geotechnical and hydrogeologic considerations for site development is presented below.

Seismic Considerations

Potential seismic hazards from earthquakes include ground shaking, surface fault rupture, liquefaction, lateral spreading and landslides. We evaluated the likelihood of each of these hazards at the site, except for landslides, which are very unlikely to occur due to the gentle topography.

We anticipate building design will follow the 2018 International Building Code (IBC). Based on the IBC, the soil profile for the project site is best characterized as Site Class D.

Based on our knowledge of regional geology in the vicinity of the site, distance to known active faults, and the substantial thickness of glacial and postglacial sediments beneath the site, we conclude the potential for surface fault rupture is remote.

Liquefaction is a condition where soils experience a rapid loss of internal strength resulting from strong ground shaking. Ground settlement, lateral spreading and sand boils may result from soil liquefaction. Structures supported on large zones of liquefied soils could undergo potentially damaging settlements or lateral movement. Conditions favorable for liquefaction include loose to medium dense sand with a low percentage of silt, and which is below the ground water table.

Based on the previous explorations and our liquefaction analyses, we conclude liquefaction induced settlements at the site will be isolated and minor, probably less than about ½ to 1 inch.

Some lateral spreading may occur immediately adjacent to the Sammamish River banks during a large earthquake. We do not anticipate the lateral spreading would extend to the project site because of the low potential for liquefaction at the site ; therefore, the risk of lateral spreading at the site is low.

Site Preparation

The surficial soils at the site contain a high percentage of fines (particles passing the U.S. Standard No. 200 sieve) and are therefore moisture sensitive. These soils may be wet during part of the year. It will be difficult to properly compact or operate equipment on these soils when they are wet. Accordingly, we recommend site preparation, shoring, excavation and foundation installation activities be planned for the normally drier late summer to early fall months so that difficulties and costs associated with these activities can be reduced. Dewatering effort within the shallow aquifer, if required, will also be reduced, and the potential for reusing the existing fill and native soils as structural fill may be increased.

Trafficability on the site is not expected to be difficult during dry weather conditions. However, the fill and native soils will be susceptible to disturbance from construction equipment during wet weather conditions, and pumping and rutting of the exposed soils under equipment loads will likely occur. Construction traffic should be limited to existing paved areas whenever feasible, particularly during wet weather.

We anticipate site preparation will largely include demolition of the existing building and removal of existing asphalt pavement and possibly underground utilities. Trees, shrubs and associated stumps and root wads should also be removed. The site should be stripped of any sod or organic soil.

Excavation

We recommend excavation for foundation elements, elevator pits, under-slab utilities and other below-grade structures be planned for the normally dry season of the year. Groundwater control and handling will require less effort and cost during the summer months when rainfall is minimal and river levels are typically low.

We anticipate the soils at the site may be excavated with conventional heavy duty construction equipment. Typical soils encountered in the previous explorations include loose to medium dense granular fill and medium dense to dense granular alluvial soils. The contractor should be prepared to address cobbles and boulders in these soils.

We recommend temporary open cut slopes around excavations be inclined at 1.5H:1V (horizontal to vertical) or flatter, depending on whether seepage is encountered in the cut. The amount of seepage will vary seasonally. Cut slopes should be made flatter if significant seepage occurs during excavation.

Permanent cut and fill slopes, if required, should be inclined at 2H:1V or flatter.

Dewatering

Based on review of groundwater level data in the previous reports and available as part of the City of Redmond's groundwater monitoring program for the Redmond Alluvial Aquifer, we expect that small to moderate groundwater seepage quantities will generally be encountered for excavations that extend up to about 10 feet below existing grades, unless the river is in flood stage, when substantially higher seepage flows and higher groundwater levels are possible.

Depending on the size and depth of the excavation required for the planned structure, and the degree to which it penetrates the underlying Redmond Alluvial Aquifer, potentially large groundwater flows may be encountered. Groundwater inflows in the range of hundreds to thousands of gallons per minute (gpm) have been encountered on similar projects in Redmond. Internal sumps are typically inadequate for managing high groundwater conditions within the downtown Redmond area. Active dewatering systems consisting of a number of deep dewatering wells around the site perimeter, equipped with individual high capacity pumps are usually required for deeper excavations.

As the site is within Wellhead Protection Zone 3 and the aquifer is a source of municipal water supply for the City of Redmond, development projects that need temporary construction dewatering must comply with City of Redmond Ordinance No. 2831, as embodied in Redmond Municipal Code (RMC) Section 13.25.

Under the RMC, projects that involve temporary construction dewatering discharges greater than 500 gpm must follow the procedures established under City of Redmond Temporary Construction Dewatering Operating Policy, including preparation and submission of a Temporary Construction Dewatering Feasibility Study. Projects that involve temporary construction dewatering of less than 500 gpm must follow the less restrictive guidelines outlined in Chapter 2 of the City of Redmond's Stormwater Technical Notebook.

If required, a Temporary Construction Dewatering Feasibility Study must be submitted prior to construction as part of site planning and entitlement review processes. This feasibility study should consist of a site-specific hydrogeological and engineering analysis which details the potential dewatering-related impacts to the City drinking water supply wells, to the municipal stormwater conveyance system, and on the potential movement of underground contaminants.

If temporary construction dewatering is shown to be feasible and is acceptable to the City of Redmond, then a Temporary Construction Dewatering Plan must be prepared as part of the construction documents. This will include a design for the dewatering system that is suited to the anticipated depth, extent and duration of the deep excavations for the subsurface structure, considering the known and potential groundwater conditions expected during the period of construction.

The specific requirements for both the Temporary Construction Dewatering Feasibility Study and Temporary Construction Dewatering Plan are outlined in the Temporary Construction Dewatering Operating Policy. We expect the need for these documents can be avoided by planning construction that is no deeper than 7 to 10 feet below existing ground level, and accepting the risk that partially constructed elements of the project could be inundated by abnormally high groundwater levels, especially during or in response to flood stages in the nearby Sammamish River.

Consideration must also be given to design of subsurface structures given the risk of high groundwater levels in response to flood stages in the Sammamish River. Subgrade structures (basement floors and walls) should be fully waterproofed up to at least 2 feet above the estimated seasonal high groundwater level and should be designed for the worst-case hydrostatic conditions (lateral loading and uplift pressures) created by a high groundwater elevation. This is expected to be a very rare event.

Alternatively, if occasional flooding (probably once every few years) of a basement structure used for parking can be tolerated, and signs of seepage stains and efflorescence on interior walls below grade are acceptable, then waterproofing can be deleted. However, pressure relief in the form of flood flaps must be

included to allow high groundwater to inundate the basement and balance hydrostatic forces that could otherwise damage floor slab and wall panel elements.

Earthwork

We anticipate minor amounts of new fill will be required for the project, particularly around the perimeter of the building and in floor slab and pavement areas. Where required, we recommend new import fill placed to support floor slabs and pavement areas consist of free-draining sand and gravel (similar to 2018 Washington State Department of Transportation [WSDOT] Standard Specification for Gravel Borrow, 9-03.14(1)). Reuse of on-site excavated soils as structural fill could be considered, provided the earthwork takes place during prolonged dry weather.

All fill placed below pavement and building areas should be placed and compacted as structural fill as presented below.

- All structural fill and trench backfill must be placed in thin lifts so that uniform compaction can be achieved throughout the entire lift thickness. Loose lift thicknesses of 10 to 12 inches are typically acceptable but will depend on the compaction equipment used at the site. Each lift must be compacted prior to placing the subsequent lift.
- Structural fill within building areas should be compacted to at least 95 percent of the maximum dry density (MDD) obtained using the ASTM International (ASTM) D 1557 test method.
- Structural fill and trench backfill placed within 2 feet of finished grades in pavement areas should be compacted to at least 95 percent of MDD (ASTM D 1557). Below a depth of 2 feet, the fill should be compacted to at least 90 percent of MDD.
- Fill not supporting structural elements or roadways should be compacted to at least 85 percent of the MDD (ASTM D 1557).
- Prior to compaction, the structural fill material should be moisture conditioned to within approximately 3 percent of optimum moisture content, otherwise adequate compaction may be difficult to achieve.
- Compaction must be achieved by mechanical means. No jetting, ponding or flooding should be used for compaction.
- The initial lift of fill over utility pipes should be thick enough to reduce the potential for damage during compaction but generally should not be greater than about 18 inches.
- During fill placement, a suitable number of in-place density tests should be performed by a representative of our firm or other qualified geotechnical engineer concurrently with the filling to evaluate whether or not the required degree of compaction is being achieved.

Erosion and Sedimentation Control

Potential sources or causes of erosion and sedimentation depend on construction methods, slope length and gradient, amount of soil exposed and/or disturbed, soil type, construction sequencing and weather. The project's impact on erosion-prone areas can be reduced by implementing an erosion and sedimentation control plan. The plan should be designed in accordance with applicable City of Redmond standards.

Temporary erosion protection should be used and maintained in areas with exposed or disturbed soils to help reduce the potential for erosion and reduce transport of sediment to adjacent areas. Temporary

erosion protection should include, but is not limited to, the construction of a silt fence around the perimeter of the work area prior to commencing grading activities. Permanent erosion protection should be provided by placement of exterior hardscape and by landscape planting.

Temporary Excavation Shoring

The planned development may have one or a partial below-grade parking level. The depth of excavation is not known at this time; however, temporary shoring will be required if the parking level excavation extends more than a few feet below existing grades. Temporary shoring will also be needed to maximize the building footprint or where there is insufficient space to use temporary open cuts. Open cuts will only be feasible if there is sufficient building setback distance from property lines.

The subsurface conditions support the use of conventional soldier pile and tieback shoring. If the excavation depth is 12 feet or less, a cantilever soldier pile wall can be economically constructed. Taller shoring walls will likely require use of tiebacks.

The City of Redmond typically allows temporary tiebacks to extend into City right-of-way or property, provided permission is obtained. Permission will also need to be obtained to install tiebacks within adjacent private property. The City does not allow permanent tiebacks for permanent subsurface walls to extend into their right-of-way. Once temporary tiebacks are no longer needed for excavation support, the City requires they be destressed.

Soldier pile walls consist of steel beams concreted into drilled vertical holes located along the wall alignment, typically about 8 feet on center. After excavation to specified elevations, tiebacks are installed, if necessary. Once the tiebacks are installed, the pullout capacity of each tieback is tested, and the tieback is locked off to the soldier pile at or near the design tieback load. Tiebacks typically consist of steel strands that are installed into pre-drilled holes and then either tremie or pressure grouted. Timber lagging is typically installed behind the flanges of the steel beams to retain the soil located between the soldier piles.

During design of the project, we can provide geotechnical recommendations for design of the soldier pile wall features, including earth pressures, surcharge loads, pile diameter and embedment depths, lagging, tieback design, installation and testing, wall drainage, construction considerations, and a shoring monitoring program, as appropriate.

Shallow Foundations

Based on the previous explorations completed at the site and the anticipated depth of excavation, medium dense to dense granular alluvial soils will be present at foundation level for the building. Shallow spread or mat foundations will therefore be suitable for this project. Shallow foundations may also be supported on a pad of compacted crushed rock that partially replaces loose or soft zones of alluvial soils that may be encountered in the building excavation.

On a preliminary basis, shallow foundations bearing on undisturbed medium dense granular alluvial deposits or bearing on a pad of compacted crushed rock fill placed over the granular alluvial deposits may be designed using an allowable soil bearing pressure of 5,000 pounds per square foot (psf). The zone of compacted fill should extend laterally beyond the footing edges a horizontal distance at least equal to the thickness of fill.

This bearing pressure applies to the sum of all dead plus long-term live loads, excluding the weight of the footing and any overlying backfill. This value may be increased by one-third when wind or seismic loads are considered. Foundation settlement for these support conditions under static loads is estimated to be on the order of ½ to 1 inch. As noted above, liquefaction induced settlement of the building is expected to be less than about ½ to 1 inch.

Excavations made below footings such as for elevator pits may encounter groundwater seepage related to the shallow aquifer, as discussed in the "Dewatering" section of this report.

Slab-on-Grade

The exposed subgrade in slab-on-grade areas should be evaluated after site grading is complete. Proof rolling with heavy rubber-tired construction equipment should be used for this purpose during dry weather and if access for this equipment is practical. Probing should be used to evaluate the subgrade during periods of wet weather or if access is not feasible for construction equipment. The exposed soil should be firm and nonyielding, and without significant groundwater present. Disturbed areas should be recompacted if possible or removed and replaced with compacted structural fill.

The slabs should be supported on undisturbed granular alluvial deposits or on compacted structural fill.

We recommend a capillary break zone consisting of crushed rock be installed directly beneath the slab. We also recommend a vapor retarder be placed in areas where moisture in the slab cannot be tolerated such as areas that will have vinyl, tile or carpeted finishes.

If the design finished floor elevation for the below-grade parking level is close to or below the estimated high groundwater level, it will be necessary to provide waterproofing to prevent entry of water into the garage. We recommend the waterproofing extend up to at least 2 feet above the estimated seasonal high groundwater level. Also, the slab and foundation system may need to be designed to resist hydrostatic uplift pressures.

If the design floor elevation is above the estimated static ground water level, we recommend a floor slab underdrain system be provided to control and collect perched groundwater that may occur above the regional groundwater level, particularly during flood stages of the Sammamish River.

The floor slab underdrain system, if appropriate, should consist of a layer of free-draining sand and gravel and a series of parallel perforated polyvinyl chloride (PVC) pipes spaced about 20 to 30 feet apart and embedded within or just below the capillary break zone fill. These pipes must be connected to the storm drain system.

We estimate settlements of floor slabs supported as recommended and subjected to uniform areal loads in the range of 100 to 200 psf will be approximately ½ inch or less. Abrupt differential settlements are not likely to occur unless highly variable floor loads are placed.

Retaining Walls

Below-grade walls and structures such as elevator pits should be designed for lateral soil pressures based on an equivalent fluid density of 35 pounds per cubic foot (pcf). This value assumes level backfill behind the wall and the ability of the wall to move laterally at the top a distance of at least one thousandth the

height of the wall. If the wall is prevented from moving this distance (i.e., nonyielding), an equivalent fluid density of 50 pcf should be used.

The recommended fluid density values also assume a free-draining condition behind the wall. This may be achieved by placing a zone of sand and gravel against the wall. A rigid, perforated pipe sloped to drain to a suitable discharge point should be installed along the base of the wall.

If drainage cannot be provided behind below-grade walls or structures, hydrostatic pressures should be added to the lateral soil pressures. The equivalent fluid densities may be reduced for the submerged portion of the backfill to 20 and 30 pcf, respectively, for yielding and nonyielding walls. In addition, it may be necessary to provide waterproofing of elevator pits. As noted above, waterproofing for below grade walls should extend up to at least 2 feet above the estimated seasonal high groundwater level. Lateral loads on below-grade elements can be resisted by passive resistance on the sides and by friction on the base. We will provide values for these components during final design, as appropriate.

Drainage

We recommend pavement surfaces be sloped away from building areas to promote drainage away from the building. Pavement areas should be graded so that surface runoff does not pond and infiltrate into the pavement section. We recommend all roof drains be connected to a tight line leading to storm drain facilities.

If the building components will not extend below the estimated high groundwater elevation, drainage behind the permanent below-grade walls constructed in front of shoring walls should be provided using prefabricated drainage board attached to the temporary shoring walls. The drainage board should be connected to weep pipes that extend through the permanent below-grade building walls at the footing elevation. Full wall face coverage is preferable for minimizing seepage and/or wet areas at the face of the permanent wall.

We recommend perimeter footing drains be installed around the building. Footing drains should typically consist of slotted, smooth-walled heavy-duty PVC pipe bedded in pea gravel or other free-draining soil along the base of perimeter footings. The footing drain system should be tight lined into the storm drain system. Roof drains should not be connected to the footing drain system but instead be tight lined independently to the storm drain system.

If the building components will extend below the estimated high groundwater level, hydrostatic uplift pressures must be considered in design.

Depending on the proposed lowest finished floor elevation, an under slab drainage system will be appropriate as discussed in the “Slab-on-Grade” section of this report.

Waterproofing

Based on the previous explorations and our experience with similar projects in alluvial soils, we anticipate waterproofing will be required if the lower parking level extends below the estimated high groundwater level at the site. The level of the groundwater will fluctuate based on season, precipitation and flood stages of the Sammamish River, and other factors.

If no special waterproofing measures are taken, leaks/seepage should be anticipated in areas of the below-grade portion of the completed facility. If leaks/seepage are unacceptable in the below-grade portion of the structure, waterproofing should be specified.

Waterproofing Options

There are many waterproofing options that include a wide range of risks and costs associated with each. Considerations include:

- ease of implementation with the planned shoring and foundation systems;
- the planned use of the facility (for example, parking space, storage space, or habitable space);
- the consequences of water seepage;
- options for mitigating water seeping into the facility; and
- planned heating and ventilation for below-grade portions of the facility.

The considerations presented above along with the experience of the design team with the various waterproofing options should assist in identifying the appropriate waterproofing system for the site, if used.

There are three general types of below grade waterproofing systems:

- Membranes/panels
- Fluid applied waterproofing
- Concrete additives

Membranes/Panels

Exterior building walls and slab-on-grade floors may be waterproofed by placing a membrane or a panel behind the walls or below the slab-on-grade. Available products include, but are not limited to:

- bentonite panels (Volclay® or similar) consisting of 4-foot by 4-foot corrugated kraft panels filled with sodium bentonite clay;
- bentonite composite liners (Voltex® or similar) consisting of two geotextile fabric layers encapsulating a layer of sodium bentonite clay;
- dual waterproofing membranes comprised of a layer of high density polyethylene (HDPE) and a layer of sodium bentonite clay (Paraseal or Swelltite™);
- rubberized asphalt and HDPE composite membranes (Bituthene®);
- HDPE membrane with a pressure sensitive adhesive that bonds to cast-in-place concrete or slab-on-grade concrete (Preprufe®); and
- thermoplastic membrane with hot-air welded seams (Sarnafil®).

Bentonite waterproofing systems have been used extensively. One potential disadvantage with bentonite waterproofing systems is that repeated wet-dry cycles may cause the membrane to crack. Dual membranes offer two layers of protection in the event water penetrates the first layer. Membrane/panel waterproofing is relatively easy to apply to vertical surfaces such as temporary shoring; however, tieback heads create local discontinuities that can require special detailing. Where spread footings and utilities are present,

membrane/panel waterproofing is more difficult to install. Hot-air welded systems offer more protection against seepage and leaks; however, the costs are relatively high.

Fluid Applied Waterproofing

Fluid applied waterproofing, such as Liquid Boot® or Procor®, provides waterproofing protection with the advantage of ease of application in areas where spread footings or other irregularly shaped features are present.

Concrete Additives

Additives, such as Caltite, can be added to the concrete used in below-grade walls and slab-on-grade floors as a waterproofing system. The primary advantage with the Caltite system is that minimal additional labor is required to install the waterproofing. Joints and penetrations in the concrete require special attention to prevent seepage and leaks.

Other Considerations

With each of the waterproofing systems described above, special attention should be directed to construction quality assurance and details such as joints and penetrations.

Pavement Design

Subgrade Preparation

We recommend the subgrade soils in new pavement areas be prepared and evaluated as described in the "Slab-on-Grade" section of this report. If the exposed subgrade soils are loose or soft, it may be necessary to excavate localized areas and replace them with structural fill or crushed rock base course. Pavement subgrade conditions should be observed during construction and prior to placing the pavement section materials to evaluate the presence of zones of unsuitable subgrade soils and the need for over-excavation and replacement of these zones.

If necessary, a layer of suitable woven geotextile fabric may be placed over soft subgrade areas to limit the thickness of structural fill required to bridge soft, yielding areas.

New Hot-Mix Asphalt Pavements

At a minimum, paved areas exposed to automobile parking only should consist of 2 inches of hot-mix asphalt (HMA), Class ½ inch, PG 58-22 over 4 inches of crushed surfacing base course. In driveways and areas of occasional truck traffic, new pavement sections should consist of at least 3 inches of HMA (PG 64-22) per WSDOT Sections 5-04 and 9-03, over a minimum 6-inch thickness of compacted Crushed Surfacing Base Course per WSDOT Section 9-03.9(3). The crushed surfacing base course should be compacted to at least 95 percent of the MDD obtained using ASTM D 1557 prior to HMA placement.

All paved and landscaped areas should be graded so that surface drainage is directed to appropriate catch basins or other suitable disposal points.

Environmental Considerations

GeoEngineers completed an environmental review of available information regarding the Evans Auto Center Property (King County Parcel Number 9270700080) located at 7440 159th Place NE in Redmond, Washington.

Current Uses

The existing building is a one-story concrete industrial/warehouse building. The current building tenants are A1 Luxury Motors and Harvey's Auto Service.

Prior Environmental Studies Completed

- G-Logics, Inc., June 26, 2018. Phase I Environmental Site Assessment, Evans Auto Center, 7440 159th Place NE, Redmond, Washington.
- G-Logics, Inc., June 28, 2018. Phase II Environmental Site Assessment, Evans Auto Center, 7440 159th Place NE, Redmond, Washington.

Based on the information presented in the above reports, the subject property is underlain by sand and gravel alluvial deposits. Groundwater was encountered at depths of approximately 18 feet below ground surface in the existing monitoring wells and flows toward the north beneath the Property.

Historical Uses and Years

The existing building was constructed in 1968. The property was historically operated as Evans Auto Center. Occupants of the building have included auto repair businesses going back to the first occupants following construction of the building. Prior tenants have also included a feed company, a carpet and interiors company, and an appliance services company. Fuel underground storage tanks (USTs) have not been identified for the property.

Adjacent and Nearby Properties

No specific adjacent properties or nearby upgradient properties appear to present a potential for migratory contamination to the subject property based on available information. Several adjacent and nearby properties are currently being redeveloped or were recently redeveloped and none of these are identified as contaminated sites on Ecology databases except for The Heron, which is located approximately 300 feet north of the Evans Auto Center site. The Heron, a new residential apartment building as of 2017, was built on the site of Accurate Auto Body, an historic auto repair facility. In 2016, one former heating oil UST was encountered on the site during construction of the Heron building. The UST was removed and approximately 52 cubic yards of petroleum-contaminated soil was reportedly excavated and transported off-site for disposal. Soil samples from the limits of the UST removal excavation on the Heron site did not contain detectable concentrations of petroleum hydrocarbons. Ecology granted a No Further Action (NFA) determination for The Heron site in September 2017.

We note that low-level tetrachloroethylene (PCE), a solvent commonly associated with dry cleaning, is widespread in groundwater beneath the downtown Redmond area. PCE has been detected in monitoring wells along Bear Creek Parkway approximately 500 feet north of the Evan's Auto Center subject property, as shown in City of Redmond maps included in Appendix B, Previously Environmental Data. PCE was not detected in groundwater samples collected by G-Logics in 2018 from monitoring wells on the Evans Auto Center property (see below).

Potential Past and Present Sources of Contamination and Previous Subsurface Assessment Findings

No past releases of petroleum or hazardous substances have been documented for the Property. The potential sources of contamination identified for the Property are possible undocumented past releases of

petroleum or hazardous substances associated with use and storage of automotive fluids for automotive repair and service activities.

The June 2018 Phase II ESA was completed to assess the potential for significant subsurface impacts from these sources and included eight direct-push borings and three hollow-stem auger borings completed as monitoring wells. The explorations were relatively widely-spaced and were situated in locations that could be easily accessed by environmental exploration equipment, while allowing for on-going property business operations to continue. Based on our review of information available at this time, the previously completed environmental exploration locations were generally appropriate in our opinion to assess the subsurface environmental conditions on a broad basis for widespread or significant impacts.

Soil and groundwater samples were selected from the Phase II ESA explorations for chemical analysis of petroleum hydrocarbons, metals, volatile organic compounds (VOCs), and polychlorinated biphenyls (PCBs). These contaminants are typical for automotive repair and services activities. Analytes were not detected in the soil or groundwater samples at concentrations greater than the corresponding MTCA Method A or B cleanup levels analyzed. Analytes detected but at concentrations lower than the referenced MTCA Method A or B cleanup levels include the following (see Appendix B for full results):

- Toluene, ethylbenzene, and/or xylenes in two soil samples (GLMW-2-20 and GLB-7-10; note that sample names are the exploration number followed by sample depth, such that GLMW-2-20 was collected from 20 feet deep in boring GLMW-2).
- Heavy oil-range petroleum hydrocarbons in four soil samples (GLB-3-12, GLB-3-16, GLB-4-19, and GLB-7-10).
- Gasoline-range petroleum hydrocarbons in one soil sample.
- Chromium, lead and arsenic were detected in one or more of the groundwater samples at concentrations either less than MTCA Method A cleanup levels and/or at concentrations similar to natural background concentrations.

Uncertainties Associated with Remaining Contamination

The Phase II ESA does not suggest that there is widespread contamination on the Property. Areas of impacted soil (at concentrations lower than MTCA screening levels) were identified on the Property based on 2018 Phase II ESA samples. Based on the property history, there is always the possibility that localized areas of impacted or contaminated soil related to historic automotive repair activities may be discovered in the future associated with building demolition or soil excavation.

Recommended Additional Services

Recommendations for additional services during the design and permitting phases of the project are summarized below:

- At this time, we do not anticipate completing additional geotechnical explorations for this project. However, we recommend that geotechnical design and recommendations for the project be based on soil parameters derived from the available subsurface information.
- We recommend pressure transducers and data loggers be installed in the three existing monitoring wells as soon as feasible so that groundwater level fluctuations during the winters of 2018-2019 and

2019-2020 can be evaluated in relation to construction dewatering, permanent below-grade waterproofing needs, hydrostatic pressures against below-grade walls, and uplift forces on the building.

- If excavation of the site to more than one level of below-grade parking is included as part of the project development plan, we expect this would result in temporary construction dewatering that would exceed 500 gpm, triggering the requirement for a Temporary Construction Dewatering Feasibility Study to be prepared and submitted.
- We recommend obtaining four seasonal quarterly groundwater sampling events from the existing environmental monitoring wells to confirm the groundwater gradient, verify the Phase II ESA conclusions, and assess the presence/absence of area-wide PCE impacts known to exist in portions of Downtown Redmond. Additional soil characterization may be warranted following demolition of the subject property building to identify end use options for soil that may be excavated during future redevelopment on the Property.
    - Pending the results of additional investigation, it is recommended to budget and plan for the contingency that USTs could be found, or that impacted or contaminated soil or groundwater could be encountered during construction.

LIMITATIONS

We have prepared this report for use by G.W. Williams Co., Cleverly Development Consulting, and their authorized agents in the due diligence phase of the residential development project to be located at 7440 159th Place NE in Redmond, Washington.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering, hydrogeology, and environmental site assessment in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix C, Report Limitations and Guidelines for Use, for additional information pertaining to use of this report.

REFERENCES

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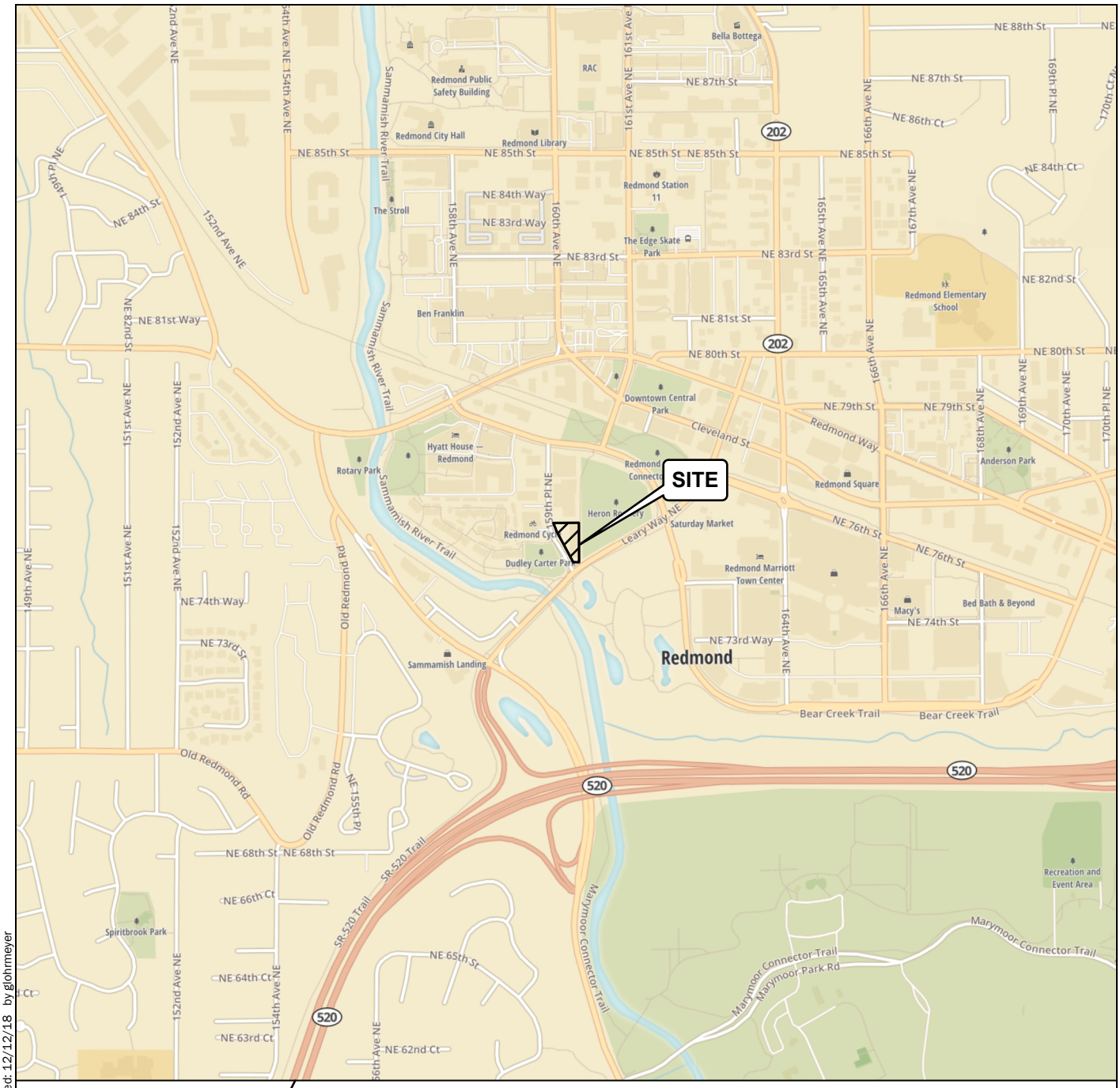

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Mapbox Open Street Map, 2018

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

Proposed Residential Development
Redmond, Washington

GeoEngineers

Figure 1

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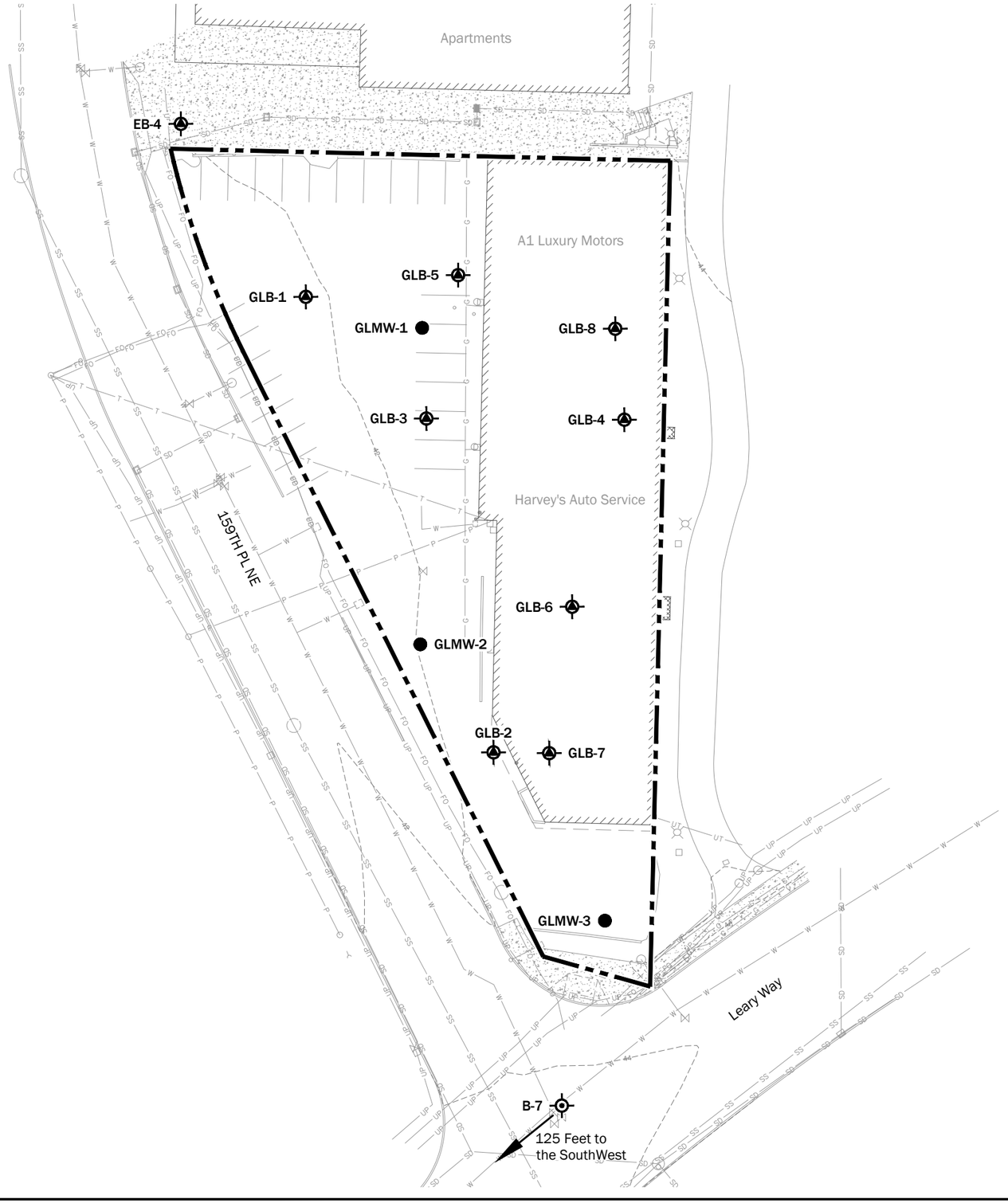

Legend

- Property Boundary
- B-7 — Boring by GeoEngineers (1998)
- GLMW-1 — Monitoring Well by Others
- GLB-1 — Direct Push Boring by Others

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Survey by ALTA dated 7/9/18.

Projection: WA State Plane, North Zone, NAD83, US Foot

N W E S

40 0 40
Feet

Site Plan

Proposed Residential Development
Redmond, Washington

GeoEngineers

Figure 2

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APPENDIX A
Field Explorations

APPENDIX A
PREVIOUS EXPLORATIONS

This appendix presents logs of selected borings completed by GeoEngineers in 1988 and by others in 2014 and 2018 within and near the project site.

The approximate locations of the previous borings are shown on the Site Plan, Figure 2.

BORING NO. 7

Depth (feet)	Lab Tests	Moisture Content	Dry Density	Blow-Count	Samples	Group Symbol	DESCRIPTION (Approximate Elevation: 41 feet)
0							7 INCHES OF ASPHALTIC CONCRETE
	MD	3.0%	127	20	■	SM	REDDISH-BROWN SILTY FINE TO MEDIUM SAND WITH GRAVEL AND OCCASIONAL CRUSHED ROCK AND COBBLES (MEDIUM DENSE, DRY TO MOIST) (FILL)
				14	■		
5						SP	BROWN FINE TO MEDIUM SAND WITH GRAVEL (MEDIUM DENSE, MOIST) (FILL)
				29	■	SM	DARK BROWN SILTY FINE SAND WITH GRAVEL AND A TRACE OF ORGANIC MATTER AND OCCASIONAL COBBLES (MEDIUM DENSE, DRY) (FILL)
10							
	MD	2.5%	117	25	■	SP	BROWN FINE TO MEDIUM SAND WITH A TRACE OF COARSE SAND AND GRAVEL (MEDIUM DENSE, MOIST)
15							
	MD, DS	3.7%	105	18	■		
20						SW	BROWN FINE TO COARSE SAND WITH A TRACE OF SILT AND GRAVEL, AND OCCASIONAL COBBLES (MEDIUM DENSE, WET)
	MD	11.0%	127	19	■		
25							
				24	■		
30						SW	GRAY FINE TO COARSE SAND WITH GRAVEL (MEDIUM DENSE TO DENSE, WET)
	MD, DS	10.0%	130	34	■		
35							
	M, GS	6.8%		37	■		
40							

DEPTH IN FEET

TEST DATA

Note: See Figure A-2 for Explanation of Symbols

GeoEngineers Incorporated

LOG OF BORING

FIGURE A-10

Associated Earth Sciences, Inc.

Exploration Log

Project Number	Exploration Number	Sheet
KE140132A	EB-4	1 of 1

Project Name	Queen City Auto	Ground Surface Elevation (ft)	
Location	Redmond, WA	Datum	N/A
Driller/Equipment	Geologic Drill / XL Rig	Date Start/Finish	3/31/14,3/31/14
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Asphalt - 2 inches					
				Quaternary Younger Alluvium					
		S-1		Medium dense, moist, brown, medium sandy fractured GRAVEL, few fine sand, few silt; stratified (~3 inches thick) (GP-GM).			11 12 13	▲25	
5		S-2		Medium dense, moist to very moist, brown, fine to medium SAND, little fractured gravel, trace coarse sand, few silt; stratified to thinly stratified (SM-SP).			9 11 13	▲24	
		S-3		Very dense, slightly moist, brown to dark brown, fine to medium SAND, with gravel, trace coarse sand, few to little silt; faintly stratified (SM-SP).			15 18 32	▲50	
10		S-4		Very dense, slightly moist to moist, brown, fine to medium SAND, little gravel, trace coarse sand, few to little silt; faintly stratified (SM-SP).			21 44 25	▲69	
						▼			
15		S-5		Medium dense, wet, brown, fine to medium SAND, with fine gravel, few coarse sand, few silt; faintly stratified (~4 inches thick) (SM-SP).			14 13 12	▲25	
20		S-6		6 inch sample; 7 inches heave. Very dense, wet, brown, gravelly fine to medium SAND, trace coarse sand, few silt; massive (SM-SP).			50/6"	▲50/6"	
25		S-7		9 inch sample; 12 inches heave. Very dense, wet, grayish brown, GRAVEL, with medium to coarse sand, trace fine sand, trace silt; massive (GP).			24 34 33	▲67	
				Bottom of exploration boring at 26.5 feet Blow counts are likely overstated due to high gravel content of soils. Soil densities likely range from loose to medium dense.					
30									
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: DMG

Approved by:

AESIBOR 140132.GPJ April 10, 2014

BORING NO. 7 (Continued)

DEPTH IN FEET	TEST DATA: Lab Tests	Moisture Content	Dry Density	Blow-Count	Samples	Group Symbol	DESCRIPTION
40						SP	GRAY FINE TO MEDIUM SAND (MEDIUM DENSE, WET)
	MD, DS	18.0%	104	20	■	SW	GRAY FINE TO COARSE SAND WITH GRAVEL AND OCCASIONAL COBBLES (MEDIUM DENSE, WET)
45						SP	GRAY FINE TO MEDIUM SAND WITH A TRACE OF SILT (DENSE, WET)
	MD	8.3%	135	41	■		
50							BORING COMPLETED AT 49.0 FEET ON 3/10/88
							GROUND WATER NOTED AT A DEPTH OF ABOUT 21 FEET DURING DRILLING

Note: See Figure A-2 for Explanation of Symbols

GeoEngineers Incorporated

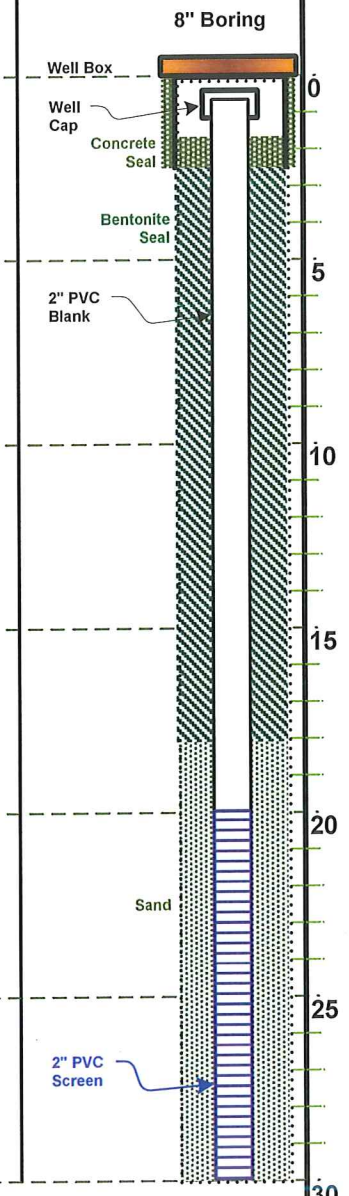
LOG OF BORING

FIGURE A-11

glmw-1 1.vsd

Depth	BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)
0	16 21 25			No Recovery at 2.5'			
5	10 14 15		GLMW-1-5	5-6.5': SAND, medium to coarse grained with fine to coarse gravel, brown, dry, no odor.	5	SW	0.0
10	18 24 16		GLMW-1-10	10-11.5': SAND, medium to coarse grained with fine to coarse gravel, brown, dry, no odor.	30	SW	0.0
15	18 29 27		GLMW-1-15	15-16.5': SAND, medium to coarse grained with fine to coarse gravel, brown, dry, no odor.	20	SW	0.1
20	50/3		GLMW-1-20	20-21.5': SAND, coarse grained with fine to coarse gravel, brown, wet, no odor.	60	SW	0.1
25	8 40 50/3		GLMW-1-25	25-25.75': SAND, coarse grained with fine to coarse gravel, brown, wet, no odor. 25.75-26.5': SAND, fine grained with trace silt, brown, moist to wet, no odor.	100	SW SP	0.1
30	Depth in feet						

WELL CONSTRUCTION



Drilling Method: Hollow-stem auger	Date: 6/19/2018	Other Information: Well Tag BKZ-663
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 1 of 2	
Logged By: H. Carter		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLMW-1

glmw-1 2.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
							8" Boring
8 14 50/6		GLMW-1-30	30-30.75': GRAVEL with trace medium grained sand, brown, moist to wet, no odor. 30.75-31.5': SAND, fine grained with trace silt, brown, moist to wet, no odor.	100	GW SP	0.0	Bentonite Backfill
8 32 50/4		GLMW-1-35	35-36.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to wet, no odor.	100	SW	0.1	
7 21 28		GLMW-1-40	40-41.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to wet, no odor.	100	SW	0.1	

30 35 40 45 50 55 60

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/19/2018	Other Information: Well Tag BKZ-664
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 2 of 2	
Logged By: H. Carter		

g-logics

Boring/Well Log
Evans Auto Center
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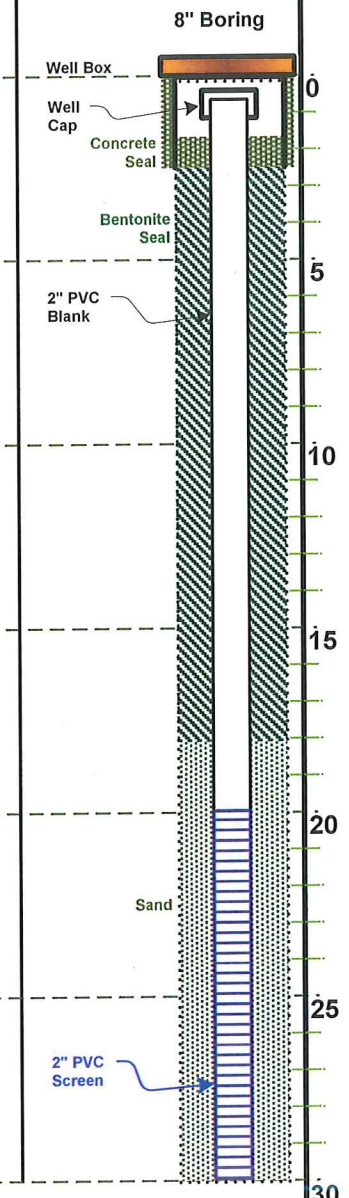
Redmond, Washington

GLMW-1

glmw-2 1.vsd

Depth	BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)
0							
5	5 14 13		GLMW-2-5	5-6.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist, no odor.	40	SW	0.0
10	6 11 11		GLMW-2-10	10-11.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist, no odor.	30	SW	0.1
15	15 28 30		GLMW-2-15	15-16.5': SAND, medium to coarse grained with fine to coarse gravel, brown, dry, no odor.	40	SW	0.0
20	24 50/4		GLMW-2-20	20-21.5': SAND, coarse grained with fine to coarse gravel, brown, wet, no odor. Very thin layer of silty sand at 21.5'.	20	SW	0.1
25	20 50/3		GLMW-2-25	25-26.5': SAND, fine to medium grained with trace gravel, brown, wet, no odor.	70	SP	0.0
30	Depth in feet						

WELL CONSTRUCTION



Drilling Method: Hollow-stem auger	Date: 6/19/2018	Other Information: Well Tag BKZ-664
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 1 of 2	
Logged By: H. Carter		

g-logics

Boring/Well Log
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GLMW-2

glmw-2 2.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
							8" Boring
30 3 15 27		GLMW-2-30	30-31.5': SAND, fine to medium grained with trace gravel, brown, moist to wet, no odor.	100	SP	0.0	Bentonite Backfill
35 11 14 18		GLMW-2-35	35-36.5': SAND, medium grained with trace gravel, brown, moist to wet, no odor.	90	SP	0.1	
40 3 9 13		GLMW-2-40	40-41.5': SAND, medium grained with trace gravel, brown, wet, no odor.	30	SP	0.1	
45							
50							
55							
60							

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/19/2018	Other Information: Well Tag BKZ-664
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 2 of 2	
Logged By: H. Carter		

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Boring/Well Log
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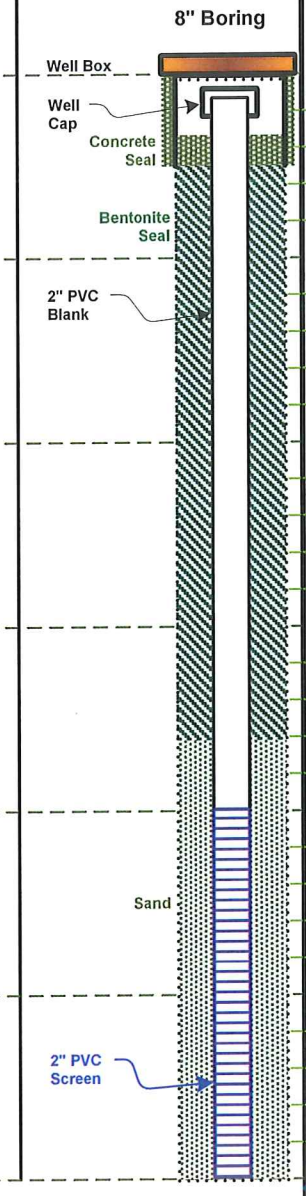
GLMW-2

glmw-3 1.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)
2 4 4		GLMW-3-2.5	2.5-4': SAND, fine grained with fine gravel, brown, dry, slight petroleum odor, woodchips at 4'.	10	SW	6.1
12 18 14		GLMW-3-5	5-6.5': SAND, fine grained with fine to coarse gravel, brown, dry, no odor.	15	SW	2.8
10 37 10		GLMW-3-10	10-11.5': SAND, medium grained with fine to coarse gravel, brown, moist to dry, no odor.	50	SW	0.3
20 40 41		GLMW-3-15	15-16.5': SAND, medium grained with fine to coarse gravel, brown, moist to dry, no odor.	60	SW	0.1
34 17 19		GLMW-3-20	20-21.5': SAND, medium grained with fine to coarse gravel, brown, wet, no odor.	10	SW	0.0
2 8 32		GLMW-3-25	25-26.5': SAND, fine to medium grained with trace gravel, gray brown, moist, no odor.	100	SP	0.1

WELL CONSTRUCTION



Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information: Well Tag BKZ-665	
Drilling Company: Holocene	Weather: Sunny		
Boring Diameter: 8"	Page 1 of 2		
Logged By: H. Carter			

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Boring/Well Log
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Redmond, Washington

GLMW-3

glmw-3 2.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
							8" Boring
14 50/6		GLMW-3-30	30-31.5': SAND, fine to medium grained with trace gravel, brown, moist to wet, no odor.	100	SP	0.0	Bentonite Backfill
6 17 47		GLMW-3-35	35-36.5': SAND, medium grained with trace gravel, brown, moist to wet, no odor.	100	SP	0.0	
6 17 32		GLMW-3-40	40-41.5': SAND, fine to medium grained with trace gravel, brown, wet, no odor.	90	SP	0.0	

30 35 40 45 50 55 60

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information: Well Tag BKZ-665
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 2 of 2	
Logged By: H. Carter		

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Boring/Well Log
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Redmond, Washington

GLMW-3

glb-1.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
0							Temporary Boring, Backfilled with Bentonite
5 10 11		GLB-1-2.5	2.5-4': SAND, medium to coarse grained with fine to coarse gravel, brown, moist, no odor.	5	SW	0.3	
5 14 16 20		GLB-1-5	5-6.5': SAND, fine grained with fine to coarse gravel, gray brown, dry, no odor.	<5		0.0	
16 50/5		GLB-1-7.5	7.5-9': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	15	SW		
10 8 11 7		GLB-1-10	10-11.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	30	SW	0.0	
15			No Recovery				
20 50/5		GLB-1-20	20-21.5': SAND, coarse grained with fine to coarse gravel, gray brown, wet, no odor.	15	SW	0.1	
25							
30							

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information:
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 1 of 1	
Logged By: H. Carter		

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Boring/Well Log
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Redmond, Washington

GLB-1

glb-2.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
0							Temporary Boring, Backfilled with Bentonite
7 11 6		GLB-2-2.5	2.5-4': SAND, medium grained with fine to coarse gravel, brown, dry, no odor.	10	SW	0.2	
5 7 11 18		GLB-2-5	5-6.5': SAND, medium grained with fine to coarse gravel, brown, dry, no odor.	5	SW	0.3	
			No Recovery				
10 13 17 12		GLB-2-10	10-11.5': SAND, fine to medium grained with fine to coarse gravel, brown, dry, no odor.	5	SW	0.3	
15 10 19 19		GLB-2-15	10-11.5': SAND, fine to medium grained with fine to coarse gravel, brown, dry, no odor.	40	SW	0.4	
20 10 7 4		GLB-2-20	20-21.5': SAND, fine to medium grained with fine to coarse gravel, brown, wet, no odor.	10	SW	0.3	
25							
30							

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information:
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 1 of 1	
Logged By: H. Carter		

g-logics

Boring/Well Log
Evans Auto Center
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Redmond, Washington

GLB-2

glb-3.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-4': SAND, very fine to fine grained with fine to coarse gravel and silt, brown, moist, no odor.		SW		Temporary Boring, Backfilled with Bentonite
		GLB-3-4		20		0.0	
			4-19': SAND, medium grained with fine to coarse gravel, brown, dry, no odor.				
		GLB-3-8		15	SW	0.0	
		GLB-3-12		15	SW	0.0	
		GLB-3-16		20	SW	0.0	
		GLB-3-20	19-24': SAND, medium to coarse grained with fine to coarse gravel and trace silt, brown, wet, no odor.	60 ▽		0.0	
		GLB-3-24		70	SW ▽	0.0	

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/19/2018	Other Information:
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 2"	Page 1 of 1	
Logged By: H. Carter		

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Boring/Well Log
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7440 159th Place NE
Redmond, Washington

GLB-3

glb-4.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-9': SAND, very fine to fine grained with fine to coarse gravel and silt, light brown, dry, no odor.		SW		Temporary Boring, Backfilled with Bentonite
		GLB-4-5		70		0.0	
		GLB-4-9	9-12': SAND, very fine to fine grained with fine to coarse gravel and silt, red, dry, slight petroleum odor.	60	SW	0.0	
		GLB-4-12	12-16': SAND, very fine to fine grained with fine to coarse gravel and silt, light brown, dry, no odor.	30	SW	0.0	
		GLB-4-16	16-19': SAND, fine grained with fine to coarse gravel and trace silt, red, dry, no odor.	30	SW	0.2	
		GLB-4-19		40	▽	0.6	

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/19/2018
Drilling Company: Holocene	Weather: Sunny
Boring Diameter: 2"	Page 1 of 1
Logged By: H. Carter	

Other Information:
Drill tip stuck in ground at 10'. Had to move hole and re-drill.

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLB-4

glb-5.vsd

Depth	BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
0								Temporary Boring, Backfilled with Bentonite
				No Recovery				
5	6 7 9		GLB-5-5	5-6.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	10		0.0	
	11 50/6		GLB-5-7.5	7.5-9': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	5	SW	0.0	
10	14 19 12		GLB-5-10	10-11.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	5	SW	0.0	
15	4 12 19		GLB-5-15	10-11.5': SAND, fine to medium grained with trace silt, brown, moist to dry, no odor.	40	SP	0.0	
20	22 50/3		GLB-5-20	20-21.5': SAND, medium to coarse grained with fine to coarse gravel, brown, wet, no odor.	10	SW	0.0	
25								
30								

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information:	
Drilling Company: Holocene	Weather: Sunny		
Boring Diameter: 8"	Page 1 of 1		
Logged By: H. Carter			

g-logics

Boring/Well Log
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Redmond, Washington

GLB-5

glb-6.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-2.5': SAND, fine grained with silt and occasional gravel, brown, dry, no odor.				Temporary Boring, Backfilled with Bentonite
		GLB-6-2.5	2.5-13': SAND, medium to coarse grained with fine to coarse gravel and silt, brown, dry to moist, no odor.	30	SW	0.0	
		GLB-6-7.5		50	SW	0.0	
		GLB-6-10				0.0	
		GLB-6-13	13-15': SAND, coarse grained with silt and trace gravel, brown, slightly moist, no odor.	100	SP	0.0	
			15-20': SAND, medium to coarse grained with fine to coarse gravel, brown, dry to wet (20'), no odor.		SW		
		GLB-6-20		40		0.0	

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/26/2018	Other Information:
Drilling Company: Holocene	Weather: Cloudy	
Boring Diameter: 2"	Page 1 of 1	
Logged By: Z. Wall		

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Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLB-6

glb-7.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-10': SAND, fine grained with silt and trace gravel, brown, dry, no odor.		SW		Temporary Boring, Backfilled with Bentonite
		GLB-7-5		5		0.0	
					SW		
		GLB-7-10		5		0.8	
			10-15': SAND, fine to coarse grained with fine to coarse gravel, brown, slightly moist, no odor.		SW		
		GLB-7-15		75		0.0	
			15-23': SAND, medium to coarse grained with fine to coarse gravel and silt, brown, dry to slightly moist, no odor.		SW		
		GLB-7-20		100		0.0	
		GLB-7-23	23-25': SAND, coarse grained with fine to coarse gravel, brown, wet, no odor.	▽	SW	0.0	
				100	▽		

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/26/2018	Other Information:
Drilling Company: Holocene	Weather: Cloudy	
Boring Diameter: 2"	Page 1 of 1	
Logged By: Z. Wall		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLB-7

glb-8.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-5': SAND, fine to medium grained with silt, Gravel, and wood, brown, dry, no odor.		SW		Temporary Boring, Backfilled with Bentonite
		GLB-8-5		5		0.0	
			5-8': GRAVEL, fine to coarse grained with sand and silt, light brown, dry, no odor.		GW		
		GLB-8-10	8-10': SAND, fine to coarse grained with fine to coarse gravel, brown, dry, no odor.	5		0.0	
			No Recovery	75	SW		
			No Recovery	100	SW		
		GLB-8-20	23-25': SAND, fine to medium grained with fine to coarse gravel, brown, dry, no odor.		SW	0.0	
		GLB-8-25		100	▽	0.0	

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/26/2018	Other Information:
Drilling Company: Holocene	Weather: Cloudy	
Boring Diameter: 2"	Page 1 of 1	
Logged By: Z. Wall		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

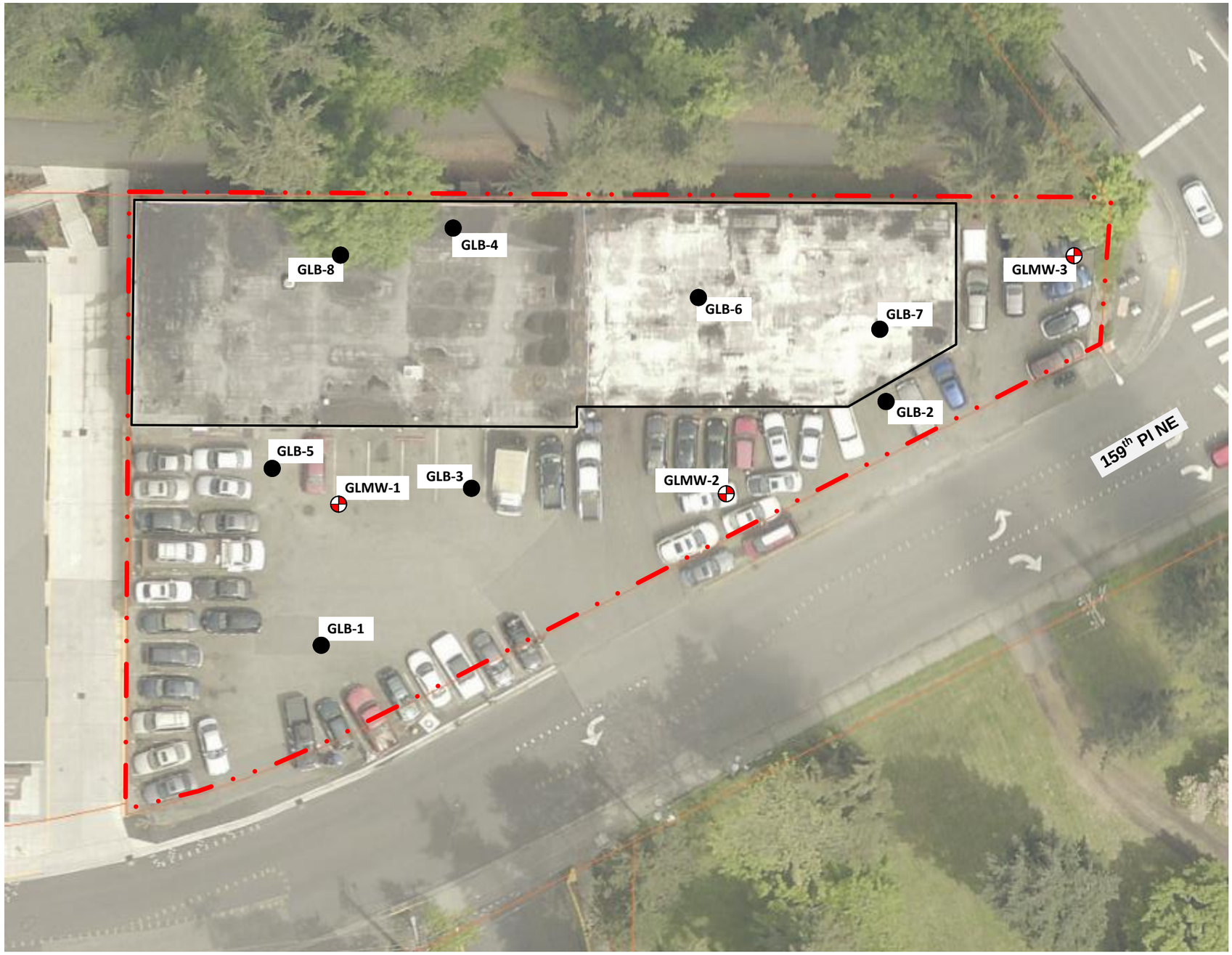
GLB-8

APPENDIX B
Previous Environmental Data

N

Legend

- Approximate Property Boundary
- Building Outline
- Soil Boring Location
- Groundwater-Monitoring Well Location



Approximate Drawing Scale: 1" = 30'

0 ft. 18 ft. 30 ft. 60 ft.

Note: This figure contains information in color. Black & white photocopies may not be suitable for review.

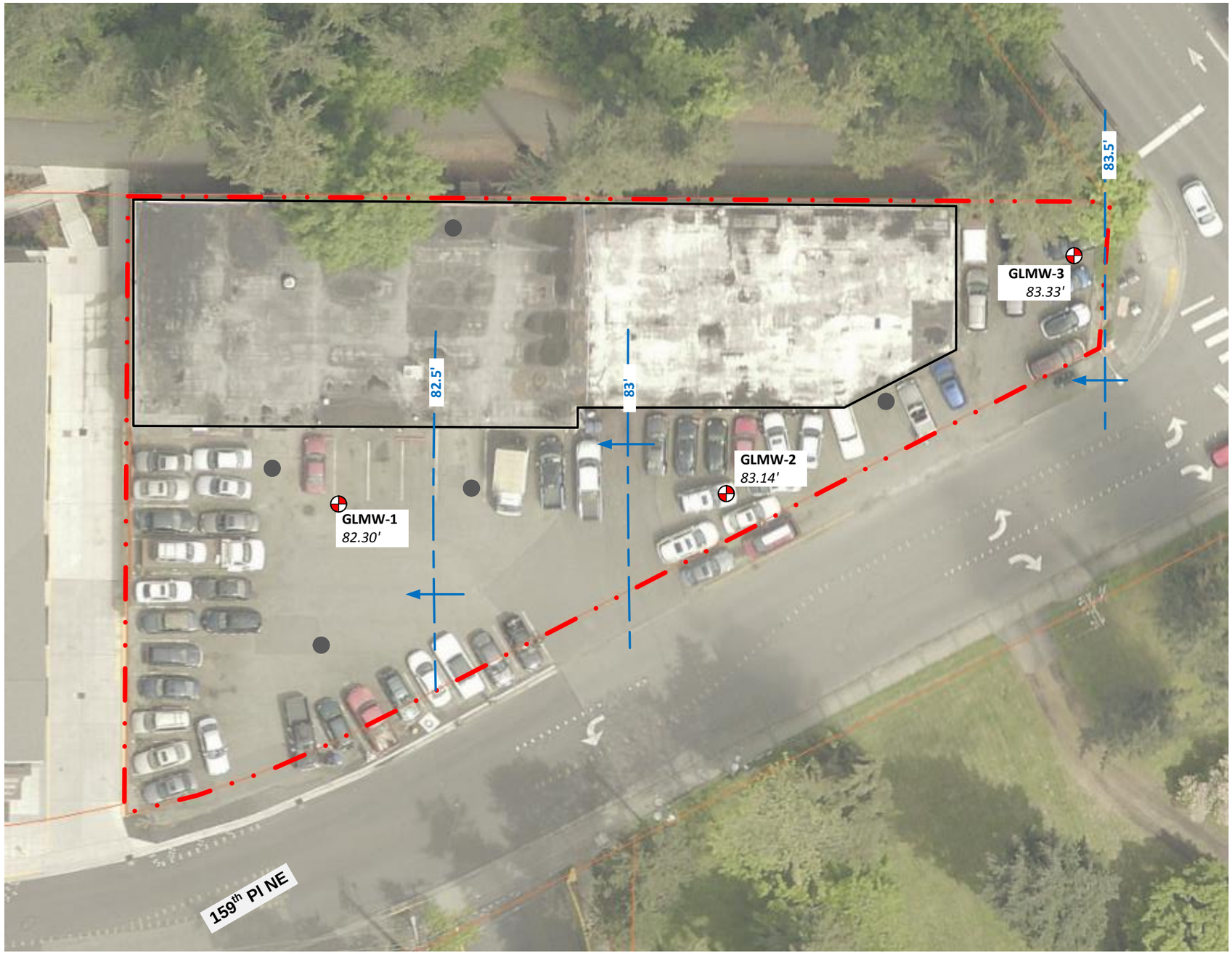
Site Diagram, Exploration Locations
Evans Auto Center
7440 159th Place NE
Redmond, Washington

Figure 2

Project File: 01-1219-B F2.vsd

g-logics

Mapping Reference: King County iMap



Legend

- Understood Property Boundary
- Building Outline
- Soil Boring Location
- Monitoring Well Location
- Interpreted GW Elevation Contour
- Interpreted GW Flow Direction

g-logics

Approximate Drawing Scale: 1" = 30'

0 ft. 18 ft. 30 ft. 60 ft.

Note: This figure contains information in color. Black & white photocopies may not be suitable for review.

Groundwater Contours, June 2018

Evans Auto Center

7440 159th Place NE

Redmond, Washington

Figure 3

Mapping Reference: King County iMap

Project File: 01-1219-B F3 GW Contours.vsd

TABLE 1
Soil Sample Analysis
Evans Auto Center
7440 159th Place NE
Redmond, Washington

Exploration Location	Sample Date	Sample Number	Sample Depth (ft)	PID Reading (ppmv) (a)	Gasoline Range Organics	Diesel Range Organics	Heavy Oil Range Organics	Benzene	Toluene	Ethylbenzene	Xylenes	Other VOCs	Arsenic	Cadmium	Chromium (III)	Chromium (VI, Hexavalent)	Lead	Mercury	PCBs
MTCA Method A Cleanup Level				NA	100(b)/30(c)	2,000	2,000	0.03	7.00	6.00	9.00	various	20.0	2.00	2,000	19.0	250	2.0	various
(units in mg/kg)																			
GLMW-1	6/19/2018	GLMW-1-5	5	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-10	10	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-15	15	0.1	<6.26	<20.6	<51.4	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-20	20	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-25	25	0.1	<5.02	<20.9	<52.2	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-30	30	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-35	35	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-40	40	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
GLMW-2	6/19/2018	GLMW-2-5	5	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-10	10	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-15	15	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-20	20	0.1	<5.40	<21.7	<54.3	<0.0216	**0.0244**	<0.0270	<0.0540	nd	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-25	25	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-30	30	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-35	35	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-40	40	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
GLMW-3	6/20/2018	GLMW-3-2.5	2.5	6.1	<6.52	<20.0	<50.1	<0.0261	<0.0261	<0.0326	<0.0652	nd	---	---	---	---	---	---	---
	6/20/2018	GLMW-3-5	5	2.8	<7.05	<20.6	<51.5	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLMW-3-10	10	0.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLMW-3-15	15	0.1	<6.11	<18.6	<46.6	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLMW-3-20	20	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLMW-3-25	25	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 1
Soil Sample Analysis
Evans Auto Center
7440 159th Place NE
Redmond, Washington

Exploration Location	Sample Date	Sample Number	Sample Depth (ft)	PID Reading (ppmv) (a)	Gasoline Range Organics	Diesel Range Organics	Heavy Oil Range Organics	Benzene	Toluene	Ethylbenzene	Xylenes	Other VOCs	Arsenic	Cadmium	Chromium (III)	Chromium (VI, Hexavalent)	Lead	Mercury	PCBs
MTCA Method A Cleanup Level				NA	100(b)/30(c)	2,000	2,000	0.03	7.00	6.00	9.00	various	20.0	2.00	2,000	19.0	250	2.0	various
(units in mg/kg)																			
GLB-1	6/20/2018	GLB-1-2.5	2.5	0.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-1-5	5	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-1-7.5	7.5	0.2	<5.36	<19.0	<47.4	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-1-10	10	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-1-20	20	0.0	<5.67	<22.4	<56.0	---	---	---	---	---	---	---	---	---	---	---	---
GLB-2	6/20/2018	GLB-2-2.5	2.5	0.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-2-5	5	0.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-2-10	10	0.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-2-15	15	0.4	---	<19.4	<48.4	<0.0247	<0.0247	<0.0309	<0.0617	nd	**5.09**	<0.154	**32.4**	<0.516	**2.07**	<0.250	---
	6/20/2018	GLB-2-20	20	0.3	<5.61	<23.1	<57.7	---	---	---	---	---	---	---	---	---	---	---	---
GLB-3	6/19/2018	GLB-3-4	4	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-3-8	8	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-3-12	12	0.0	---	<19.3	**200**	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-3-16	16	0.0	---	<18.1	**149**	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-3-20	20	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-3-24	24	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
GLB-4	6/19/2018	GLB-4-5	5	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-4-9	9	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-4-12	12	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-4-16	16	0.2	<6.47	<20.5	<51.4	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-4-19	19	0.6	---	<18.0	**466**	---	---	---	---	---	---	---	---	---	---	---	---
GLB-5	6/20/2018	GLB-4-5	5	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-4-7.5	7.5	0.0	<6.37	<18.7	<46.6	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-4-10	10	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-4-15	15	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-4-20	20	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 1
Soil Sample Analysis
Evans Auto Center
7440 159th Place NE
Redmond, Washington

Exploration Location	Sample Date	Sample Number	Sample Depth (ft)	PID Reading (ppmv) (a)	Gasoline Range Organics	Diesel Range Organics	Heavy Oil Range Organics	Benzene	Toluene	Ethylbenzene	Xylenes	Other VOCs	Arsenic	Cadmium	Chromium (III)	Chromium (VI, Hexavalent)	Lead	Mercury	PCBs
MTCA Method A Cleanup Level				NA	100(b)/30(c)	2,000	2,000	0.03	7.00	6.00	9.00	various	20.0	2.00	2,000	19.0	250	2.0	various
(units in mg/kg)																			
GLB-6	6/26/2018	GLB-6-2.5	2.5	0.0	<5.85	<21.9	<54.6	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-6-7.5	7.5	0.0	---	<18.2	<45.6	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-6-10	10	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-6-13	13	0.0	<6.85	<18.6	<46.5	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-6-20	20	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
GLB-7	6/26/2018	GLB-7-5	5	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-7-10	10	0.8	**14.2**	<20.7	**343**	<0.0212	**0.334**	**0.0793**	**0.541**	nd	**5.24**	**0.329**	**43.9**	---	**4.81**	<0.250	nd
	6/26/2018	GLB-7-15	15	0.0	<7.84	<20.1	<50.2	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-7-20	20	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-7-23	23	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
GLB-8	6/26/2018	GLB-8-5	5	0.0	<7.17	<20.6	<51.5	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-8-10	10	0.0				---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-8-20	20	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-8-25	25	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Notes: Refer to site diagram(s) for sampling locations. Refer to laboratory reports for analytical methods.

(1) Available Method A Cleanup Levels or Most Conservative Method B Cleanup Levels, MTCA, revised 2013.

(a) Soil samples were field screened using a PID to measure VOCs. Headspace VOC concentrations were measured after placing the soil in a sealed plastic bag and allowing soil and air inside the bag to equilibrate.

(b) Soil Cleanup Level for Gasoline with no detectable benzene in the soil.

(c) Soil Cleanup Level for Gasoline with detectable benzene in the soil.

--- Sample not analyzed.

nd Other VOC sample concentrations below laboratory reporting limits.

<50.0 Sample concentration below laboratory reporting limit.

27 Bold number(s) indicates contaminant detected, below cleanup level.

160 Bold number(s) and yellow shading indicates concentration exceeds MTCA Cleanup Level.

TABLE 2
Groundwater Sample Analysis
Evans Auto Center
7440 159th Place NE
Redmond, Washington

Exploration Location	Sample Date	Sample Number	Gasoline Range Organics	Diesel Range Organics	Heavy Oil Range Organics	Benzene	Toluene	Ethylbenzene	Xylenes	Other VOCs	Arsenic	Arsenic, Dissolved	Cadmium	Chromium (Total)	Lead	Mercury
MTCA Cleanup Level(1)			1,000(a)/800(b)	500	500	5.00	1,000	700	1,000	various	5	5	5	50	15	2
(units in ug/L)																
GLMW-1	6/21/2018	GLMW-1	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	nd	**10.9**	**10.2**	<0.200	**2.48**	**0.826**	<0.100
GLMW-2	6/21/2018	GLMW-2	<50.0	<50.0	<99.9	<1.00	<1.00	<1.00	<1.00	nd	**11.5**	**12.9**	<0.200	**1.01**	<0.500	<0.100
	6/21/2018	GLMW-A (Dup)	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	nd	**12.4**	---	<0.200	**1.02**	<0.500	<0.100
GLMW-3	6/21/2018	GLMW-3	<50.0	<50.0	<99.9	<1.00	<1.00	<1.00	<1.00	nd	**7.61**	**7.43**	<0.200	**2.21**	<0.500	<0.100

Notes: Refer to site diagram(s) for sampling locations. Refer to laboratory reports for analytical methods.

(1) Available Method A Cleanup Levels or Most Conservative Method B Cleanup Levels, MTCA, revised 2015.

(a) Groundwater Cleanup Level for Gasoline with no detectable benzene in groundwater.

(b) Groundwater Cleanup Level for Gasoline with detectable benzene in the groundwater.

Dup Duplicate Sample for QA/QC.

nd Other VOC sample concentrations below laboratory reporting limits.

<50.0 Sample concentration below laboratory reporting limit.

27 Bold number(s) indicates contaminant detected, below cleanup level.

160 Bold number(s) and yellow shading indicates concentration exceeds MTCA Cleanup Level. Adjusting these concentrations for ecology-identified concentrations yields detected concentrations below Method A cleanup levels.

Table 3
Groundwater Elevation Measurements
Evans Auto Center
7440 159th Place NE
Redmond, Washington

Location Designation	Well Installation Date	Elevation Top of PVC Casing (ft.)*	Depth to Top of Screen (ft.)	Depth to Bottom of Screen (ft.)	Well Diameter (in.)	Date Measured	Depth to Water (ft.)	Calculated Elevations (ft.)
GLMW-01	6/19/18	100.71	20	30	2	06/21/18	18.41	82.30
GLMW-02	6/19/18	101.17	20	30	2	06/21/18	18.03	83.14
GLMW-03	6/20/18	102.29	20	30	2	06/21/18	18.96	83.33

Notes:

* Elevations Based off SE Corner of the Catch Basin along 159th Place NE

APPENDIX C
Report Limitations and Guidelines for Use

APPENDIX C
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

It is important to recognize that the geoscience practices (geotechnical engineering, geology and environmental science) rely on professional judgment and opinion to a greater extent than other engineering and natural science disciplines, where more precise and/or readily observable data may exist. To help clients better understand how this difference pertains to our services, GeoEngineers includes the following explanatory "limitations" provisions in its reports. Please confer with GeoEngineers if you need to know more how these "Report Limitations and Guidelines for Use" apply to your project or site.

Geotechnical Services are Performed for Specific Purposes, Persons and Projects

This report has been prepared for G. W. Williams Co., Cleverly Development Consulting and members of the design team for the Project specifically identified in this report. The information contained herein is not applicable to other sites or projects.

GeoEngineers structures its services to meet the specific needs of its clients. No party other than the party to whom this report is addressed may rely on the product of our services unless we agree to such reliance in advance and in writing. Within the limitations of the agreed scope of services for the Project, and its schedule and budget, our services have been executed in accordance with our proposal dated November 13, 2018 and generally accepted geotechnical, hydrogeologic and environmental practices in this area at the time this report was prepared. We do not authorize, and will not be responsible for, the use of this report for any purposes or projects other than those identified in the report.

A Geotechnical Engineering or Geologic Report is Based on A Unique Set of Project-Specific Factors

This report has been prepared for the due diligence phase of a proposed residential development to be located at 7440 159th Place NE in Redmond, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

[1] Developed based on material provided by GBA, GeoProfessional Business Association; www.geoprofessional.org.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed structure(s);
- elevation, configuration, location, orientation or weight of the proposed structure;
- composition of the design team; or
- project ownership.

If changes occur after the date of this report, GeoEngineers cannot be responsible for any consequences of such changes in relation to this report unless we have been given the opportunity to review our interpretations and recommendations. Based on that review, we can provide written modifications or confirmation, as appropriate.

Previous Environmental Studies

GeoEngineers makes no warranties or guarantees regarding the accuracy or completeness of information provided or compiled by others. The information presented in this report is based on the above-described research and a single recent site visit. GeoEngineers has relied upon information provided by others in our description of historical conditions and in our review of regulatory databases and files. The available data do not provide definitive information with regard to all past uses, operations or incidents at the subject property or adjacent properties.

Evaluation of site environmental conditions relative to cleanup levels should be evaluated on a case by case basis considering potential receptors (human health, terrestrial ecological) and potential affected media (soil, groundwater, indoor air). Note that hazardous substances may be present in some of the site soil, groundwater and/or indoor air at detectable concentrations that are less than the cleanup levels referenced in previous studies. GeoEngineers should be contacted prior to the export or reuse of soil or groundwater from the subject site to evaluate the potential for associated environmental liabilities. We cannot be responsible for potential environmental liability arising out of the transfer of soil and/or groundwater from the subject Site to another location or its reuse on site in instances that we were not aware of or could not control.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by man-made events such as construction on or adjacent to the site, new information or technology that becomes available subsequent to the report date, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. If more than a few months have passed since issuance of our report or work product, or if any of the described events may have occurred, please contact GeoEngineers before applying this report for its intended purpose so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Geotechnical and Geologic Findings Are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies the specific subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied its professional judgment to render an informed opinion about subsurface conditions at other locations. Actual subsurface conditions may differ, sometimes significantly, from the opinions presented in this report. Our report, conclusions and interpretations are not a warranty of the actual subsurface conditions.

Geotechnical Engineering Report Recommendations Are Not Final

We have developed our preliminary recommendations based on data gathered from subsurface exploration(s). These explorations sample just a small percentage of a site to create a snapshot of the subsurface conditions elsewhere on the site. Such sampling on its own cannot provide a complete and accurate view of subsurface conditions for the entire site. Therefore, the recommendations included in this report are preliminary and should not be considered final. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for the recommendations in this report if we do not perform construction observation.

We recommend that you allow sufficient monitoring, testing and consultation during construction by GeoEngineers to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes if the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork and foundation installation activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective means of managing the risks associated with unanticipated conditions. If another party performs field observation and confirms our expectations, the other party must take full responsibility for both the observations and recommendations. Please note, however, that another party would lack our project-specific knowledge and resources.

A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation

Misinterpretation of this report by members of the design team or by contractors can result in costly problems. GeoEngineers can help reduce the risks of misinterpretation by conferring with appropriate members of the design team after submitting the report, reviewing pertinent elements of the design team's plans and specifications, participating in pre-bid and preconstruction conferences, and providing construction observation.

Do Not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final exploration logs based upon their interpretation of field logs and laboratory data. The logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Photographic or electronic reproduction is acceptable, but separating logs from the report can create a risk of misinterpretation.

Give Contractors a Complete Report and Guidance

To help reduce the risk of problems associated with unanticipated subsurface conditions, GeoEngineers recommends giving contractors the complete geotechnical engineering or geologic report, including these "Report Limitations and Guidelines for Use." When providing the report, you should preface it with a clearly written letter of transmittal that:

- advises contractors that the report was not prepared for purposes of bid development and that its accuracy is limited; and
- encourages contractors to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer.

Contractors Are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and adjacent properties.

Biological Pollutants

GeoEngineers' Scope of Services specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants, and no conclusions or inferences should be drawn regarding Biological Pollutants as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria and viruses, and/or any of their byproducts.

A Client who desires these specialized services is advised to obtain them from a consultant who offers services in this specialized field.

Information on Water Levels in the Ground May Be Confusing

The groundwater information in this report may appear confusing and could be misunderstood. We try to show the depth at which groundwater was encountered on all our boring logs, but in some soils, this can be very different from the true groundwater level. Monitoring wells installed in borings give the most reliable information, but this may apply only to the soil layer(s) in which the well is screened. If the top of the well screen or sand/gravel pack is more than a few feet below the groundwater level, then that groundwater level may not correspond to the true groundwater elevation. Soils that are described on our logs as "wet" are usually below the groundwater level, but perched groundwater can also make the interpretation of groundwater conditions difficult.

Groundwater levels typically vary seasonally by a few feet to as much as 100 feet or more depending on location, site conditions, recharge, and many other factors. If in any doubt, you should have a hydrogeologist from GeoEngineers confer with appropriate members of the design team to help them interpret groundwater level information and apply it to the project. The consequences of misunderstanding groundwater levels can be serious, which impacts can range from drainage problems and inadequate provision for construction dewatering, to water intrusion, hydrostatic instability of the subgrade and uplift of completed structures.

SITE DESCRIPTION

Geology

Geologic information for the project vicinity was obtained from the map entitled "Geologic Map of the Kirkland Quadrangle, Washington" (Minard 1983) published by the United States Geological Survey (USGS). The native geologic unit mapped in the site vicinity consists of alluvium.

The alluvium is mapped along and east of the Sammamish River and consists primarily of near-surface organic rich fine sand, silt and clay. Peat layers are often present in the upper few feet of the alluvium. Sand and gravel alluvial deposits underlie the surficial soils.

Fill associated with past grading for existing building and pavement areas mantles the alluvial deposits.

Critical/Sensitive Areas Delineation

Review of the City of Redmond Critical Areas Maps and King County Sensitive Areas Maps indicate the project area is located within Wellhead Protection Zone 3 and within a mapped Seismic Hazard Area. The project area is also within a Critical Aquifer Recharge Area (CARA) in accordance with the City of Redmond Zoning Code Section 20D.140.50.

Surface Conditions

The triangular-shaped property comprises approximately 0.62 acres and is identified as King County Parcel Number 9270700080. Existing site features are shown in Figure 2.

The site is bounded on the north by a recently completed apartment building (The Carter on the Park), on the east by Heron Rookery Park, on the south by Leary Way NE, and on the west by 159th Place NE. The property is owned by G.W. Williams Co. and is currently occupied by automotive facilities (A1 Luxury Motors and Harvey's Auto Service). A one-story automobile repair shop constructed in 1968 occupies the east part of the site. Asphalt paved parking and driveway areas are located in the north and west parts of the site.

The ground surface is generally level. The finished floor of the existing building is at about Elevation 43 feet. (Elevations in this report refer to the North American Vertical Datum of 1988 [NAVD 88].) Surface grades outside the building range from about Elevation 41 to 43 feet. Underground power and fiber optic lines extend along the west edge of the site.

Subsurface Soil Conditions

Based on our review of available subsurface information, the subsurface soils in the vicinity of the site generally consist of fill soils with varying thicknesses overlying medium dense to dense granular alluvial deposits, as discussed below:

- **Pavement and Floor Slab Materials:** Several of the borings were drilled within asphalt paved areas and within the existing building. The thicknesses of the pavement and floor slab were not noted on the boring logs.
- **Fill:** Existing fill was apparently encountered in the upper 5 feet of borings GLMW-3 and GLB-8, based on the presence of wood fragments. The fill layer is described as loose sand with gravel. The remaining boring logs did not note the presence of fill.

- **Granular Alluvium:** Medium dense to dense sand and gravel alluvial deposits were encountered in all of the explorations and extend to the maximum depth explored, 41½ feet.

Groundwater Conditions

Groundwater was encountered in the previous explorations and monitoring wells within about 18 to 20 feet of the existing ground surface. These measurements were made in late June 2018.

This groundwater represents a shallow aquifer within the near surface alluvial soils that is part of the Redmond Alluvial Aquifer underlying the downtown area. This aquifer is in direct hydraulic communication with the Sammamish River, located within 200 feet of the southern end of the site. We expect the groundwater level will rise in response to seasonal precipitation and flood stages of the river and could be as high as 7 to 10 feet below the ground surface during flood stage.

CONCLUSIONS AND RECOMMENDATIONS

Geotechnical and Hydrogeologic Considerations

Based on the previous explorations, analyses and experience on nearby projects in the downtown Redmond area, we conclude the residential project can be satisfactorily completed as planned. Suitable foundation support can consist of shallow foundations placed directly on the medium dense to dense granular alluvial soils, or on a zone of structural fill replacing loose soils that may be encountered at footing subgrade level. A detailed discussion of geotechnical and hydrogeologic considerations for site development is presented below.

Seismic Considerations

Potential seismic hazards from earthquakes include ground shaking, surface fault rupture, liquefaction, lateral spreading and landslides. We evaluated the likelihood of each of these hazards at the site, except for landslides, which are very unlikely to occur due to the gentle topography.

We anticipate building design will follow the 2018 International Building Code (IBC). Based on the IBC, the soil profile for the project site is best characterized as Site Class D.

Based on our knowledge of regional geology in the vicinity of the site, distance to known active faults, and the substantial thickness of glacial and postglacial sediments beneath the site, we conclude the potential for surface fault rupture is remote.

Liquefaction is a condition where soils experience a rapid loss of internal strength resulting from strong ground shaking. Ground settlement, lateral spreading and sand boils may result from soil liquefaction. Structures supported on large zones of liquefied soils could undergo potentially damaging settlements or lateral movement. Conditions favorable for liquefaction include loose to medium dense sand with a low percentage of silt, and which is below the ground water table.

Based on the previous explorations and our liquefaction analyses, we conclude liquefaction induced settlements at the site will be isolated and minor, probably less than about ½ to 1 inch.

Some lateral spreading may occur immediately adjacent to the Sammamish River banks during a large earthquake. We do not anticipate the lateral spreading would extend to the project site because of the low potential for liquefaction at the site ; therefore, the risk of lateral spreading at the site is low.

Site Preparation

The surficial soils at the site contain a high percentage of fines (particles passing the U.S. Standard No. 200 sieve) and are therefore moisture sensitive. These soils may be wet during part of the year. It will be difficult to properly compact or operate equipment on these soils when they are wet. Accordingly, we recommend site preparation, shoring, excavation and foundation installation activities be planned for the normally drier late summer to early fall months so that difficulties and costs associated with these activities can be reduced. Dewatering effort within the shallow aquifer, if required, will also be reduced, and the potential for reusing the existing fill and native soils as structural fill may be increased.

Trafficability on the site is not expected to be difficult during dry weather conditions. However, the fill and native soils will be susceptible to disturbance from construction equipment during wet weather conditions, and pumping and rutting of the exposed soils under equipment loads will likely occur. Construction traffic should be limited to existing paved areas whenever feasible, particularly during wet weather.

We anticipate site preparation will largely include demolition of the existing building and removal of existing asphalt pavement and possibly underground utilities. Trees, shrubs and associated stumps and root wads should also be removed. The site should be stripped of any sod or organic soil.

Excavation

We recommend excavation for foundation elements, elevator pits, under-slab utilities and other below-grade structures be planned for the normally dry season of the year. Groundwater control and handling will require less effort and cost during the summer months when rainfall is minimal and river levels are typically low.

We anticipate the soils at the site may be excavated with conventional heavy duty construction equipment. Typical soils encountered in the previous explorations include loose to medium dense granular fill and medium dense to dense granular alluvial soils. The contractor should be prepared to address cobbles and boulders in these soils.

We recommend temporary open cut slopes around excavations be inclined at 1.5H:1V (horizontal to vertical) or flatter, depending on whether seepage is encountered in the cut. The amount of seepage will vary seasonally. Cut slopes should be made flatter if significant seepage occurs during excavation.

Permanent cut and fill slopes, if required, should be inclined at 2H:1V or flatter.

Dewatering

Based on review of groundwater level data in the previous reports and available as part of the City of Redmond's groundwater monitoring program for the Redmond Alluvial Aquifer, we expect that small to moderate groundwater seepage quantities will generally be encountered for excavations that extend up to about 10 feet below existing grades, unless the river is in flood stage, when substantially higher seepage flows and higher groundwater levels are possible.

Depending on the size and depth of the excavation required for the planned structure, and the degree to which it penetrates the underlying Redmond Alluvial Aquifer, potentially large groundwater flows may be encountered. Groundwater inflows in the range of hundreds to thousands of gallons per minute (gpm) have been encountered on similar projects in Redmond. Internal sumps are typically inadequate for managing high groundwater conditions within the downtown Redmond area. Active dewatering systems consisting of a number of deep dewatering wells around the site perimeter, equipped with individual high capacity pumps are usually required for deeper excavations.

As the site is within Wellhead Protection Zone 3 and the aquifer is a source of municipal water supply for the City of Redmond, development projects that need temporary construction dewatering must comply with City of Redmond Ordinance No. 2831, as embodied in Redmond Municipal Code (RMC) Section 13.25.

Under the RMC, projects that involve temporary construction dewatering discharges greater than 500 gpm must follow the procedures established under City of Redmond Temporary Construction Dewatering Operating Policy, including preparation and submission of a Temporary Construction Dewatering Feasibility Study. Projects that involve temporary construction dewatering of less than 500 gpm must follow the less restrictive guidelines outlined in Chapter 2 of the City of Redmond's Stormwater Technical Notebook.

If required, a Temporary Construction Dewatering Feasibility Study must be submitted prior to construction as part of site planning and entitlement review processes. This feasibility study should consist of a site-specific hydrogeological and engineering analysis which details the potential dewatering-related impacts to the City drinking water supply wells, to the municipal stormwater conveyance system, and on the potential movement of underground contaminants.

If temporary construction dewatering is shown to be feasible and is acceptable to the City of Redmond, then a Temporary Construction Dewatering Plan must be prepared as part of the construction documents. This will include a design for the dewatering system that is suited to the anticipated depth, extent and duration of the deep excavations for the subsurface structure, considering the known and potential groundwater conditions expected during the period of construction.

The specific requirements for both the Temporary Construction Dewatering Feasibility Study and Temporary Construction Dewatering Plan are outlined in the Temporary Construction Dewatering Operating Policy. We expect the need for these documents can be avoided by planning construction that is no deeper than 7 to 10 feet below existing ground level, and accepting the risk that partially constructed elements of the project could be inundated by abnormally high groundwater levels, especially during or in response to flood stages in the nearby Sammamish River.

Consideration must also be given to design of subsurface structures given the risk of high groundwater levels in response to flood stages in the Sammamish River. Subgrade structures (basement floors and walls) should be fully waterproofed up to at least 2 feet above the estimated seasonal high groundwater level and should be designed for the worst-case hydrostatic conditions (lateral loading and uplift pressures) created by a high groundwater elevation. This is expected to be a very rare event.

Alternatively, if occasional flooding (probably once every few years) of a basement structure used for parking can be tolerated, and signs of seepage stains and efflorescence on interior walls below grade are acceptable, then waterproofing can be deleted. However, pressure relief in the form of flood flaps must be

included to allow high groundwater to inundate the basement and balance hydrostatic forces that could otherwise damage floor slab and wall panel elements.

Earthwork

We anticipate minor amounts of new fill will be required for the project, particularly around the perimeter of the building and in floor slab and pavement areas. Where required, we recommend new import fill placed to support floor slabs and pavement areas consist of free-draining sand and gravel (similar to 2018 Washington State Department of Transportation [WSDOT] Standard Specification for Gravel Borrow, 9-03.14(1)). Reuse of on-site excavated soils as structural fill could be considered, provided the earthwork takes place during prolonged dry weather.

All fill placed below pavement and building areas should be placed and compacted as structural fill as presented below.

- All structural fill and trench backfill must be placed in thin lifts so that uniform compaction can be achieved throughout the entire lift thickness. Loose lift thicknesses of 10 to 12 inches are typically acceptable but will depend on the compaction equipment used at the site. Each lift must be compacted prior to placing the subsequent lift.
- Structural fill within building areas should be compacted to at least 95 percent of the maximum dry density (MDD) obtained using the ASTM International (ASTM) D 1557 test method.
- Structural fill and trench backfill placed within 2 feet of finished grades in pavement areas should be compacted to at least 95 percent of MDD (ASTM D 1557). Below a depth of 2 feet, the fill should be compacted to at least 90 percent of MDD.
- Fill not supporting structural elements or roadways should be compacted to at least 85 percent of the MDD (ASTM D 1557).
- Prior to compaction, the structural fill material should be moisture conditioned to within approximately 3 percent of optimum moisture content, otherwise adequate compaction may be difficult to achieve.
- Compaction must be achieved by mechanical means. No jetting, ponding or flooding should be used for compaction.
- The initial lift of fill over utility pipes should be thick enough to reduce the potential for damage during compaction but generally should not be greater than about 18 inches.
- During fill placement, a suitable number of in-place density tests should be performed by a representative of our firm or other qualified geotechnical engineer concurrently with the filling to evaluate whether or not the required degree of compaction is being achieved.

Erosion and Sedimentation Control

Potential sources or causes of erosion and sedimentation depend on construction methods, slope length and gradient, amount of soil exposed and/or disturbed, soil type, construction sequencing and weather. The project's impact on erosion-prone areas can be reduced by implementing an erosion and sedimentation control plan. The plan should be designed in accordance with applicable City of Redmond standards.

Temporary erosion protection should be used and maintained in areas with exposed or disturbed soils to help reduce the potential for erosion and reduce transport of sediment to adjacent areas. Temporary

erosion protection should include, but is not limited to, the construction of a silt fence around the perimeter of the work area prior to commencing grading activities. Permanent erosion protection should be provided by placement of exterior hardscape and by landscape planting.

Temporary Excavation Shoring

The planned development may have one or a partial below-grade parking level. The depth of excavation is not known at this time; however, temporary shoring will be required if the parking level excavation extends more than a few feet below existing grades. Temporary shoring will also be needed to maximize the building footprint or where there is insufficient space to use temporary open cuts. Open cuts will only be feasible if there is sufficient building setback distance from property lines.

The subsurface conditions support the use of conventional soldier pile and tieback shoring. If the excavation depth is 12 feet or less, a cantilever soldier pile wall can be economically constructed. Taller shoring walls will likely require use of tiebacks.

The City of Redmond typically allows temporary tiebacks to extend into City right-of-way or property, provided permission is obtained. Permission will also need to be obtained to install tiebacks within adjacent private property. The City does not allow permanent tiebacks for permanent subsurface walls to extend into their right-of-way. Once temporary tiebacks are no longer needed for excavation support, the City requires they be destressed.

Soldier pile walls consist of steel beams concreted into drilled vertical holes located along the wall alignment, typically about 8 feet on center. After excavation to specified elevations, tiebacks are installed, if necessary. Once the tiebacks are installed, the pullout capacity of each tieback is tested, and the tieback is locked off to the soldier pile at or near the design tieback load. Tiebacks typically consist of steel strands that are installed into pre-drilled holes and then either tremie or pressure grouted. Timber lagging is typically installed behind the flanges of the steel beams to retain the soil located between the soldier piles.

During design of the project, we can provide geotechnical recommendations for design of the soldier pile wall features, including earth pressures, surcharge loads, pile diameter and embedment depths, lagging, tieback design, installation and testing, wall drainage, construction considerations, and a shoring monitoring program, as appropriate.

Shallow Foundations

Based on the previous explorations completed at the site and the anticipated depth of excavation, medium dense to dense granular alluvial soils will be present at foundation level for the building. Shallow spread or mat foundations will therefore be suitable for this project. Shallow foundations may also be supported on a pad of compacted crushed rock that partially replaces loose or soft zones of alluvial soils that may be encountered in the building excavation.

On a preliminary basis, shallow foundations bearing on undisturbed medium dense granular alluvial deposits or bearing on a pad of compacted crushed rock fill placed over the granular alluvial deposits may be designed using an allowable soil bearing pressure of 5,000 pounds per square foot (psf). The zone of compacted fill should extend laterally beyond the footing edges a horizontal distance at least equal to the thickness of fill.

This bearing pressure applies to the sum of all dead plus long-term live loads, excluding the weight of the footing and any overlying backfill. This value may be increased by one-third when wind or seismic loads are considered. Foundation settlement for these support conditions under static loads is estimated to be on the order of ½ to 1 inch. As noted above, liquefaction induced settlement of the building is expected to be less than about ½ to 1 inch.

Excavations made below footings such as for elevator pits may encounter groundwater seepage related to the shallow aquifer, as discussed in the "Dewatering" section of this report.

Slab-on-Grade

The exposed subgrade in slab-on-grade areas should be evaluated after site grading is complete. Proof rolling with heavy rubber-tired construction equipment should be used for this purpose during dry weather and if access for this equipment is practical. Probing should be used to evaluate the subgrade during periods of wet weather or if access is not feasible for construction equipment. The exposed soil should be firm and nonyielding, and without significant groundwater present. Disturbed areas should be recompacted if possible or removed and replaced with compacted structural fill.

The slabs should be supported on undisturbed granular alluvial deposits or on compacted structural fill.

We recommend a capillary break zone consisting of crushed rock be installed directly beneath the slab. We also recommend a vapor retarder be placed in areas where moisture in the slab cannot be tolerated such as areas that will have vinyl, tile or carpeted finishes.

If the design finished floor elevation for the below-grade parking level is close to or below the estimated high groundwater level, it will be necessary to provide waterproofing to prevent entry of water into the garage. We recommend the waterproofing extend up to at least 2 feet above the estimated seasonal high groundwater level. Also, the slab and foundation system may need to be designed to resist hydrostatic uplift pressures.

If the design floor elevation is above the estimated static ground water level, we recommend a floor slab underdrain system be provided to control and collect perched groundwater that may occur above the regional groundwater level, particularly during flood stages of the Sammamish River.

The floor slab underdrain system, if appropriate, should consist of a layer of free-draining sand and gravel and a series of parallel perforated polyvinyl chloride (PVC) pipes spaced about 20 to 30 feet apart and embedded within or just below the capillary break zone fill. These pipes must be connected to the storm drain system.

We estimate settlements of floor slabs supported as recommended and subjected to uniform areal loads in the range of 100 to 200 psf will be approximately ½ inch or less. Abrupt differential settlements are not likely to occur unless highly variable floor loads are placed.

Retaining Walls

Below-grade walls and structures such as elevator pits should be designed for lateral soil pressures based on an equivalent fluid density of 35 pounds per cubic foot (pcf). This value assumes level backfill behind the wall and the ability of the wall to move laterally at the top a distance of at least one thousandth the

height of the wall. If the wall is prevented from moving this distance (i.e., nonyielding), an equivalent fluid density of 50 pcf should be used.

The recommended fluid density values also assume a free-draining condition behind the wall. This may be achieved by placing a zone of sand and gravel against the wall. A rigid, perforated pipe sloped to drain to a suitable discharge point should be installed along the base of the wall.

If drainage cannot be provided behind below-grade walls or structures, hydrostatic pressures should be added to the lateral soil pressures. The equivalent fluid densities may be reduced for the submerged portion of the backfill to 20 and 30 pcf, respectively, for yielding and nonyielding walls. In addition, it may be necessary to provide waterproofing of elevator pits. As noted above, waterproofing for below grade walls should extend up to at least 2 feet above the estimated seasonal high groundwater level. Lateral loads on below-grade elements can be resisted by passive resistance on the sides and by friction on the base. We will provide values for these components during final design, as appropriate.

Drainage

We recommend pavement surfaces be sloped away from building areas to promote drainage away from the building. Pavement areas should be graded so that surface runoff does not pond and infiltrate into the pavement section. We recommend all roof drains be connected to a tight line leading to storm drain facilities.

If the building components will not extend below the estimated high groundwater elevation, drainage behind the permanent below-grade walls constructed in front of shoring walls should be provided using prefabricated drainage board attached to the temporary shoring walls. The drainage board should be connected to weep pipes that extend through the permanent below-grade building walls at the footing elevation. Full wall face coverage is preferable for minimizing seepage and/or wet areas at the face of the permanent wall.

We recommend perimeter footing drains be installed around the building. Footing drains should typically consist of slotted, smooth-walled heavy-duty PVC pipe bedded in pea gravel or other free-draining soil along the base of perimeter footings. The footing drain system should be tight lined into the storm drain system. Roof drains should not be connected to the footing drain system but instead be tight lined independently to the storm drain system.

If the building components will extend below the estimated high groundwater level, hydrostatic uplift pressures must be considered in design.

Depending on the proposed lowest finished floor elevation, an under slab drainage system will be appropriate as discussed in the “Slab-on-Grade” section of this report.

Waterproofing

Based on the previous explorations and our experience with similar projects in alluvial soils, we anticipate waterproofing will be required if the lower parking level extends below the estimated high groundwater level at the site. The level of the groundwater will fluctuate based on season, precipitation and flood stages of the Sammamish River, and other factors.

If no special waterproofing measures are taken, leaks/seepage should be anticipated in areas of the below-grade portion of the completed facility. If leaks/seepage are unacceptable in the below-grade portion of the structure, waterproofing should be specified.

Waterproofing Options

There are many waterproofing options that include a wide range of risks and costs associated with each. Considerations include:

- ease of implementation with the planned shoring and foundation systems;
- the planned use of the facility (for example, parking space, storage space, or habitable space);
- the consequences of water seepage;
- options for mitigating water seeping into the facility; and
- planned heating and ventilation for below-grade portions of the facility.

The considerations presented above along with the experience of the design team with the various waterproofing options should assist in identifying the appropriate waterproofing system for the site, if used.

There are three general types of below grade waterproofing systems:

- Membranes/panels
- Fluid applied waterproofing
- Concrete additives

Membranes/Panels

Exterior building walls and slab-on-grade floors may be waterproofed by placing a membrane or a panel behind the walls or below the slab-on-grade. Available products include, but are not limited to:

- bentonite panels (Volclay® or similar) consisting of 4-foot by 4-foot corrugated kraft panels filled with sodium bentonite clay;
- bentonite composite liners (Voltex® or similar) consisting of two geotextile fabric layers encapsulating a layer of sodium bentonite clay;
- dual waterproofing membranes comprised of a layer of high density polyethylene (HDPE) and a layer of sodium bentonite clay (Paraseal or Swelltite™);
- rubberized asphalt and HDPE composite membranes (Bituthene®);
- HDPE membrane with a pressure sensitive adhesive that bonds to cast-in-place concrete or slab-on-grade concrete (Preprufe®); and
- thermoplastic membrane with hot-air welded seams (Sarnafil®).

Bentonite waterproofing systems have been used extensively. One potential disadvantage with bentonite waterproofing systems is that repeated wet-dry cycles may cause the membrane to crack. Dual membranes offer two layers of protection in the event water penetrates the first layer. Membrane/panel waterproofing is relatively easy to apply to vertical surfaces such as temporary shoring; however, tieback heads create local discontinuities that can require special detailing. Where spread footings and utilities are present,

membrane/panel waterproofing is more difficult to install. Hot-air welded systems offer more protection against seepage and leaks; however, the costs are relatively high.

Fluid Applied Waterproofing

Fluid applied waterproofing, such as Liquid Boot® or Procor®, provides waterproofing protection with the advantage of ease of application in areas where spread footings or other irregularly shaped features are present.

Concrete Additives

Additives, such as Caltite, can be added to the concrete used in below-grade walls and slab-on-grade floors as a waterproofing system. The primary advantage with the Caltite system is that minimal additional labor is required to install the waterproofing. Joints and penetrations in the concrete require special attention to prevent seepage and leaks.

Other Considerations

With each of the waterproofing systems described above, special attention should be directed to construction quality assurance and details such as joints and penetrations.

Pavement Design

Subgrade Preparation

We recommend the subgrade soils in new pavement areas be prepared and evaluated as described in the "Slab-on-Grade" section of this report. If the exposed subgrade soils are loose or soft, it may be necessary to excavate localized areas and replace them with structural fill or crushed rock base course. Pavement subgrade conditions should be observed during construction and prior to placing the pavement section materials to evaluate the presence of zones of unsuitable subgrade soils and the need for over-excavation and replacement of these zones.

If necessary, a layer of suitable woven geotextile fabric may be placed over soft subgrade areas to limit the thickness of structural fill required to bridge soft, yielding areas.

New Hot-Mix Asphalt Pavements

At a minimum, paved areas exposed to automobile parking only should consist of 2 inches of hot-mix asphalt (HMA), Class ½ inch, PG 58-22 over 4 inches of crushed surfacing base course. In driveways and areas of occasional truck traffic, new pavement sections should consist of at least 3 inches of HMA (PG 64-22) per WSDOT Sections 5-04 and 9-03, over a minimum 6-inch thickness of compacted Crushed Surfacing Base Course per WSDOT Section 9-03.9(3). The crushed surfacing base course should be compacted to at least 95 percent of the MDD obtained using ASTM D 1557 prior to HMA placement.

All paved and landscaped areas should be graded so that surface drainage is directed to appropriate catch basins or other suitable disposal points.

Environmental Considerations

GeoEngineers completed an environmental review of available information regarding the Evans Auto Center Property (King County Parcel Number 9270700080) located at 7440 159th Place NE in Redmond, Washington.

Current Uses

The existing building is a one-story concrete industrial/warehouse building. The current building tenants are A1 Luxury Motors and Harvey's Auto Service.

Prior Environmental Studies Completed

- G-Logics, Inc., June 26, 2018. Phase I Environmental Site Assessment, Evans Auto Center, 7440 159th Place NE, Redmond, Washington.
- G-Logics, Inc., June 28, 2018. Phase II Environmental Site Assessment, Evans Auto Center, 7440 159th Place NE, Redmond, Washington.

Based on the information presented in the above reports, the subject property is underlain by sand and gravel alluvial deposits. Groundwater was encountered at depths of approximately 18 feet below ground surface in the existing monitoring wells and flows toward the north beneath the Property.

Historical Uses and Years

The existing building was constructed in 1968. The property was historically operated as Evans Auto Center. Occupants of the building have included auto repair businesses going back to the first occupants following construction of the building. Prior tenants have also included a feed company, a carpet and interiors company, and an appliance services company. Fuel underground storage tanks (USTs) have not been identified for the property.

Adjacent and Nearby Properties

No specific adjacent properties or nearby upgradient properties appear to present a potential for migratory contamination to the subject property based on available information. Several adjacent and nearby properties are currently being redeveloped or were recently redeveloped and none of these are identified as contaminated sites on Ecology databases except for The Heron, which is located approximately 300 feet north of the Evans Auto Center site. The Heron, a new residential apartment building as of 2017, was built on the site of Accurate Auto Body, an historic auto repair facility. In 2016, one former heating oil UST was encountered on the site during construction of the Heron building. The UST was removed and approximately 52 cubic yards of petroleum-contaminated soil was reportedly excavated and transported off-site for disposal. Soil samples from the limits of the UST removal excavation on the Heron site did not contain detectable concentrations of petroleum hydrocarbons. Ecology granted a No Further Action (NFA) determination for The Heron site in September 2017.

We note that low-level tetrachloroethylene (PCE), a solvent commonly associated with dry cleaning, is widespread in groundwater beneath the downtown Redmond area. PCE has been detected in monitoring wells along Bear Creek Parkway approximately 500 feet north of the Evan's Auto Center subject property, as shown in City of Redmond maps included in Appendix B, Previously Environmental Data. PCE was not detected in groundwater samples collected by G-Logics in 2018 from monitoring wells on the Evans Auto Center property (see below).

Potential Past and Present Sources of Contamination and Previous Subsurface Assessment Findings

No past releases of petroleum or hazardous substances have been documented for the Property. The potential sources of contamination identified for the Property are possible undocumented past releases of

petroleum or hazardous substances associated with use and storage of automotive fluids for automotive repair and service activities.

The June 2018 Phase II ESA was completed to assess the potential for significant subsurface impacts from these sources and included eight direct-push borings and three hollow-stem auger borings completed as monitoring wells. The explorations were relatively widely-spaced and were situated in locations that could be easily accessed by environmental exploration equipment, while allowing for on-going property business operations to continue. Based on our review of information available at this time, the previously completed environmental exploration locations were generally appropriate in our opinion to assess the subsurface environmental conditions on a broad basis for widespread or significant impacts.

Soil and groundwater samples were selected from the Phase II ESA explorations for chemical analysis of petroleum hydrocarbons, metals, volatile organic compounds (VOCs), and polychlorinated biphenyls (PCBs). These contaminants are typical for automotive repair and services activities. Analytes were not detected in the soil or groundwater samples at concentrations greater than the corresponding MTCA Method A or B cleanup levels analyzed. Analytes detected but at concentrations lower than the referenced MTCA Method A or B cleanup levels include the following (see Appendix B for full results):

- Toluene, ethylbenzene, and/or xylenes in two soil samples (GLMW-2-20 and GLB-7-10; note that sample names are the exploration number followed by sample depth, such that GLMW-2-20 was collected from 20 feet deep in boring GLMW-2).
- Heavy oil-range petroleum hydrocarbons in four soil samples (GLB-3-12, GLB-3-16, GLB-4-19, and GLB-7-10).
- Gasoline-range petroleum hydrocarbons in one soil sample.
- Chromium, lead and arsenic were detected in one or more of the groundwater samples at concentrations either less than MTCA Method A cleanup levels and/or at concentrations similar to natural background concentrations.

Uncertainties Associated with Remaining Contamination

The Phase II ESA does not suggest that there is widespread contamination on the Property. Areas of impacted soil (at concentrations lower than MTCA screening levels) were identified on the Property based on 2018 Phase II ESA samples. Based on the property history, there is always the possibility that localized areas of impacted or contaminated soil related to historic automotive repair activities may be discovered in the future associated with building demolition or soil excavation.

Recommended Additional Services

Recommendations for additional services during the design and permitting phases of the project are summarized below:

- At this time, we do not anticipate completing additional geotechnical explorations for this project. However, we recommend that geotechnical design and recommendations for the project be based on soil parameters derived from the available subsurface information.
- We recommend pressure transducers and data loggers be installed in the three existing monitoring wells as soon as feasible so that groundwater level fluctuations during the winters of 2018-2019 and

2019-2020 can be evaluated in relation to construction dewatering, permanent below-grade waterproofing needs, hydrostatic pressures against below-grade walls, and uplift forces on the building.

- If excavation of the site to more than one level of below-grade parking is included as part of the project development plan, we expect this would result in temporary construction dewatering that would exceed 500 gpm, triggering the requirement for a Temporary Construction Dewatering Feasibility Study to be prepared and submitted.
- We recommend obtaining four seasonal quarterly groundwater sampling events from the existing environmental monitoring wells to confirm the groundwater gradient, verify the Phase II ESA conclusions, and assess the presence/absence of area-wide PCE impacts known to exist in portions of Downtown Redmond. Additional soil characterization may be warranted following demolition of the subject property building to identify end use options for soil that may be excavated during future redevelopment on the Property.
    - Pending the results of additional investigation, it is recommended to budget and plan for the contingency that USTs could be found, or that impacted or contaminated soil or groundwater could be encountered during construction.

LIMITATIONS

We have prepared this report for use by G.W. Williams Co., Cleverly Development Consulting, and their authorized agents in the due diligence phase of the residential development project to be located at 7440 159th Place NE in Redmond, Washington.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering, hydrogeology, and environmental site assessment in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix C, Report Limitations and Guidelines for Use, for additional information pertaining to use of this report.

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FIGURES

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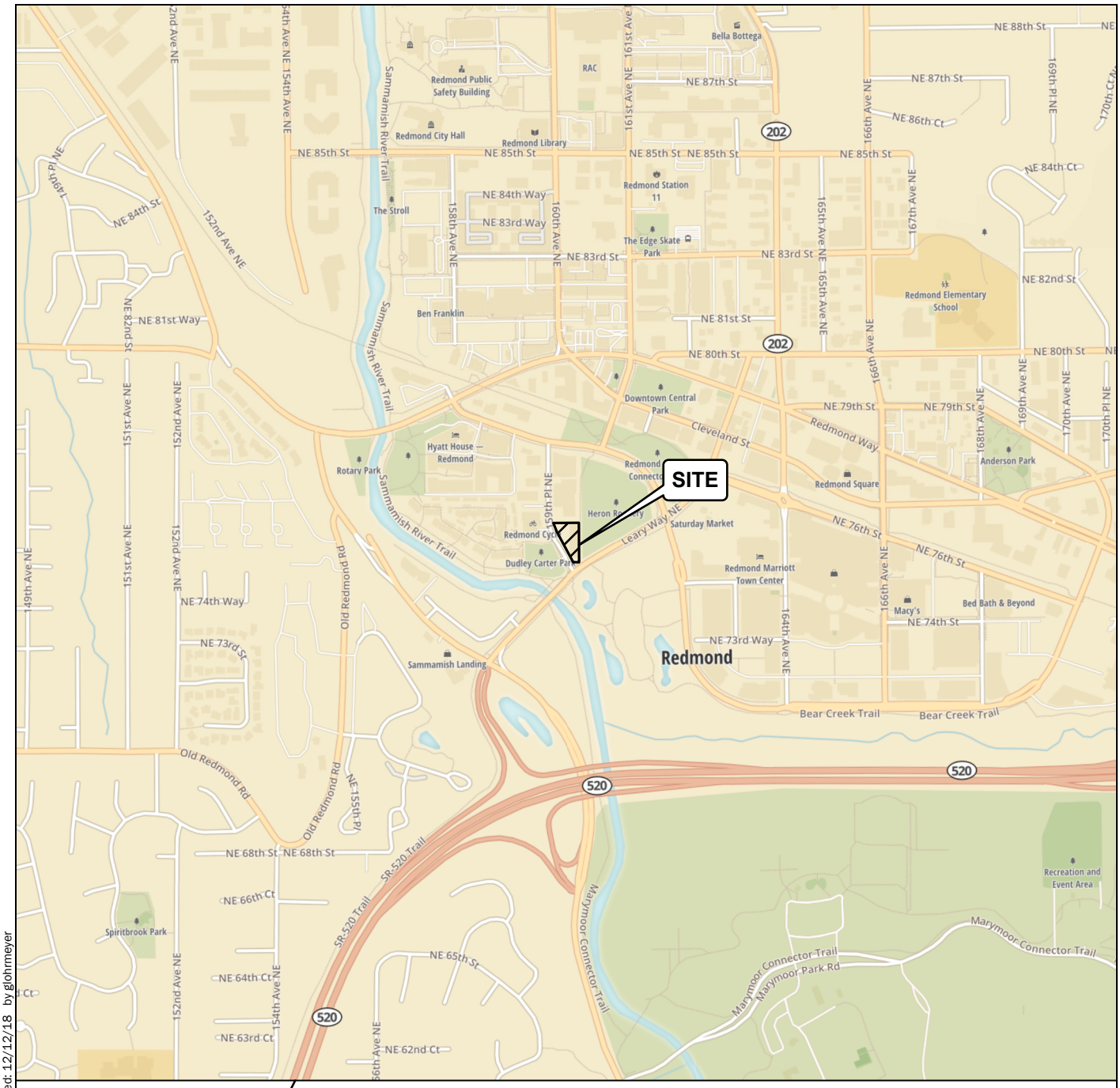

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Mapbox Open Street Map, 2018

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

Proposed Residential Development
Redmond, Washington

GeoEngineers

Figure 1

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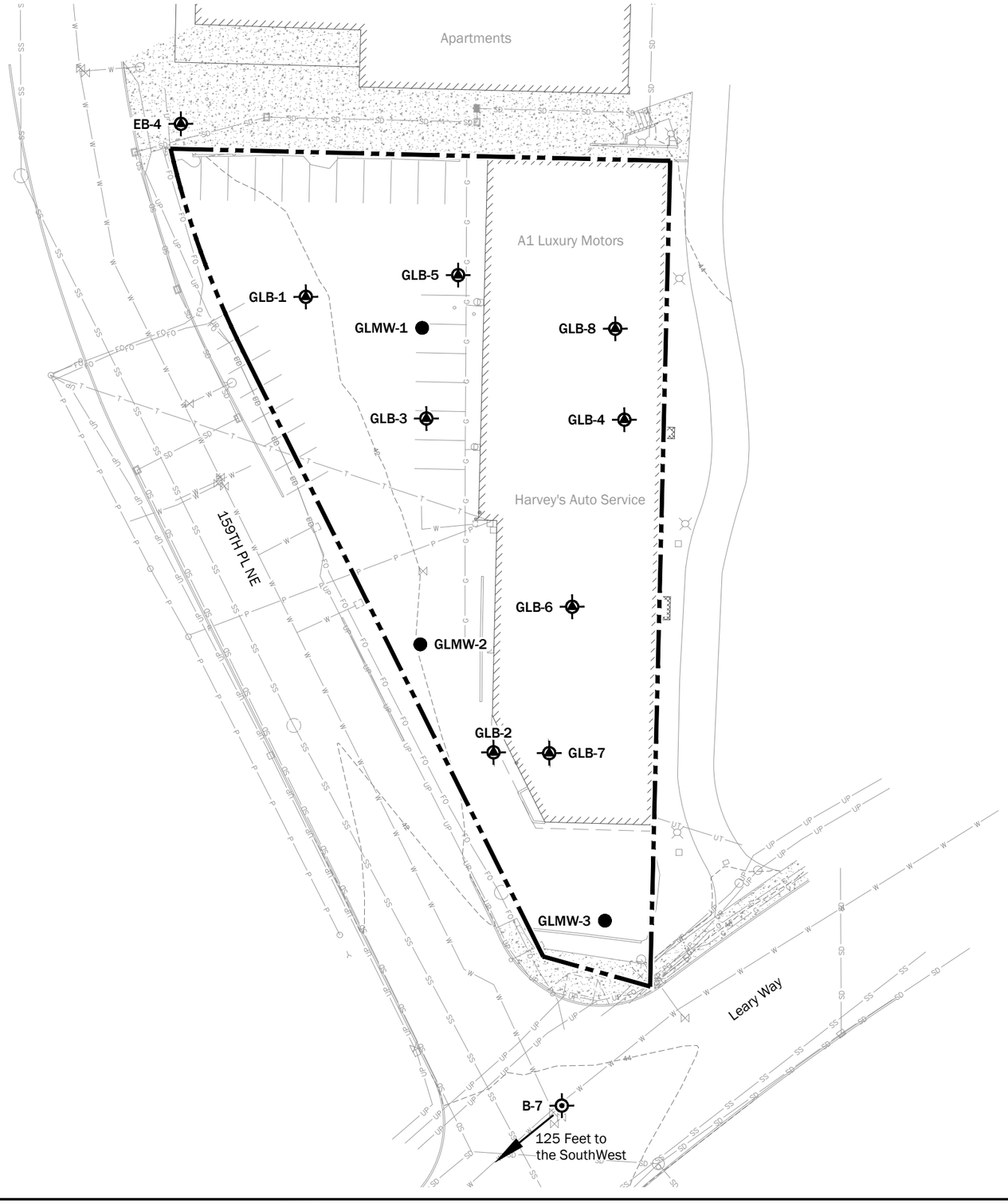


Legend

- Property Boundary
- B-7 — Boring by GeoEngineers (1998)
- GLMW-1 — Monitoring Well by Others
- GLB-1 — Direct Push Boring by Others

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Survey by ALTA dated 7/9/18.

Projection: WA State Plane, North Zone, NAD83, US Foot

N W E S

40 0 40
Feet

Site Plan

Proposed Residential Development
Redmond, Washington

GeoEngineers

Figure 2

P:\23\23699001\CAD\00\GeoTech\23699001 00_F02_Site Plan.dwg TAB:F02 Date Exported: 01/11/19 - 11:45 by cstickel

APPENDICES

GeoEngineers

APPENDIX A
Field Explorations

APPENDIX A
PREVIOUS EXPLORATIONS

This appendix presents logs of selected borings completed by GeoEngineers in 1988 and by others in 2014 and 2018 within and near the project site.

The approximate locations of the previous borings are shown on the Site Plan, Figure 2.

BORING NO. 7

Depth (feet)	Lab Tests	Moisture Content	Dry Density	Blow-Count	Samples	Group Symbol	DESCRIPTION (Approximate Elevation: 41 feet)
0							7 INCHES OF ASPHALTIC CONCRETE
	MD	3.0%	127	20	■	SM	REDDISH-BROWN SILTY FINE TO MEDIUM SAND WITH GRAVEL AND OCCASIONAL CRUSHED ROCK AND COBBLES (MEDIUM DENSE, DRY TO MOIST) (FILL)
				14	■		
5						SP	BROWN FINE TO MEDIUM SAND WITH GRAVEL (MEDIUM DENSE, MOIST) (FILL)
				29	■	SM	DARK BROWN SILTY FINE SAND WITH GRAVEL AND A TRACE OF ORGANIC MATTER AND OCCASIONAL COBBLES (MEDIUM DENSE, DRY) (FILL)
10							
	MD	2.5%	117	25	■	SP	BROWN FINE TO MEDIUM SAND WITH A TRACE OF COARSE SAND AND GRAVEL (MEDIUM DENSE, MOIST)
15							
	MD, DS	3.7%	105	18	■		
20						SW	BROWN FINE TO COARSE SAND WITH A TRACE OF SILT AND GRAVEL, AND OCCASIONAL COBBLES (MEDIUM DENSE, WET)
	MD	11.0%	127	19	■		
25							
				24	■		
30						SW	GRAY FINE TO COARSE SAND WITH GRAVEL (MEDIUM DENSE TO DENSE, WET)
	MD, DS	10.0%	130	34	■		
35							
	M, GS	6.8%		37	■		
40							

DEPTH IN FEET

TEST DATA

Note: See Figure A-2 for Explanation of Symbols

GeoEngineers Incorporated

LOG OF BORING

FIGURE A-10

Associated Earth Sciences, Inc.

Exploration Log

Project Number	Exploration Number	Sheet
KE140132A	EB-4	1 of 1

Project Name	Queen City Auto	Ground Surface Elevation (ft)	
Location	Redmond, WA	Datum	N/A
Driller/Equipment	Geologic Drill / XL Rig	Date Start/Finish	3/31/14,3/31/14
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Asphalt - 2 inches					
				Quaternary Younger Alluvium					
		S-1		Medium dense, moist, brown, medium sandy fractured GRAVEL, few fine sand, few silt; stratified (~3 inches thick) (GP-GM).			11 12 13	▲25	
5		S-2		Medium dense, moist to very moist, brown, fine to medium SAND, little fractured gravel, trace coarse sand, few silt; stratified to thinly stratified (SM-SP).			9 11 13	▲24	
		S-3		Very dense, slightly moist, brown to dark brown, fine to medium SAND, with gravel, trace coarse sand, few to little silt; faintly stratified (SM-SP).			15 18 32	▲50	
10		S-4		Very dense, slightly moist to moist, brown, fine to medium SAND, little gravel, trace coarse sand, few to little silt; faintly stratified (SM-SP).			21 44 25	▲69	
						▼			
15		S-5		Medium dense, wet, brown, fine to medium SAND, with fine gravel, few coarse sand, few silt; faintly stratified (~4 inches thick) (SM-SP).			14 13 12	▲25	
20		S-6		6 inch sample; 7 inches heave. Very dense, wet, brown, gravelly fine to medium SAND, trace coarse sand, few silt; massive (SM-SP).			50/6"	▲50/6"	
25		S-7		9 inch sample; 12 inches heave. Very dense, wet, grayish brown, GRAVEL, with medium to coarse sand, trace fine sand, trace silt; massive (GP).			24 34 33	▲67	
				Bottom of exploration boring at 26.5 feet Blow counts are likely overstated due to high gravel content of soils. Soil densities likely range from loose to medium dense.					
30									
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: DMG

Approved by:

AESIBOR 140132.GPJ April 10, 2014

BORING NO. 7 (Continued)

DEPTH IN FEET	TEST DATA: Lab Tests	Moisture Content	Dry Density	Blow-Count	Samples	Group Symbol	DESCRIPTION
40						SP	GRAY FINE TO MEDIUM SAND (MEDIUM DENSE, WET)
	MD, DS	18.0%	104	20	■	SW	GRAY FINE TO COARSE SAND WITH GRAVEL AND OCCASIONAL COBBLES (MEDIUM DENSE, WET)
45						SP	GRAY FINE TO MEDIUM SAND WITH A TRACE OF SILT (DENSE, WET)
	MD	8.3%	135	41	■		
50							BORING COMPLETED AT 49.0 FEET ON 3/10/88
							GROUND WATER NOTED AT A DEPTH OF ABOUT 21 FEET DURING DRILLING

Note: See Figure A-2 for Explanation of Symbols

GeoEngineers Incorporated

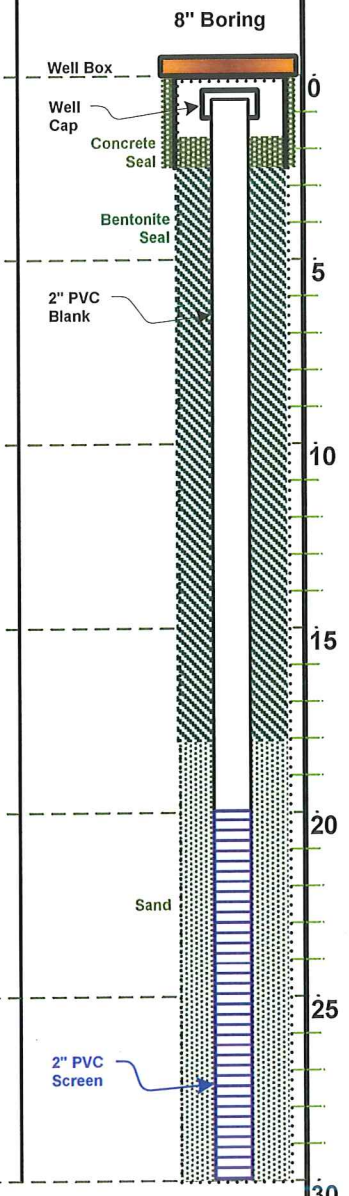
LOG OF BORING

FIGURE A-11

glmw-1 1.vsd

Depth	BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)
0	16 21 25			No Recovery at 2.5'			
5	10 14 15		GLMW-1-5	5-6.5': SAND, medium to coarse grained with fine to coarse gravel, brown, dry, no odor.	5	SW	0.0
10	18 24 16		GLMW-1-10	10-11.5': SAND, medium to coarse grained with fine to coarse gravel, brown, dry, no odor.	30	SW	0.0
15	18 29 27		GLMW-1-15	15-16.5': SAND, medium to coarse grained with fine to coarse gravel, brown, dry, no odor.	20	SW	0.1
20	50/3		GLMW-1-20	20-21.5': SAND, coarse grained with fine to coarse gravel, brown, wet, no odor.	60	SW	0.1
25	8 40 50/3		GLMW-1-25	25-25.75': SAND, coarse grained with fine to coarse gravel, brown, wet, no odor. 25.75-26.5': SAND, fine grained with trace silt, brown, moist to wet, no odor.	100	SW SP	0.1
30	Depth in feet						

WELL CONSTRUCTION



Drilling Method: Hollow-stem auger	Date: 6/19/2018	Other Information: Well Tag BKZ-663
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 1 of 2	
Logged By: H. Carter		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLMW-1

glmw-1 2.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
							8" Boring
8 14 50/6		GLMW-1-30	30-30.75': GRAVEL with trace medium grained sand, brown, moist to wet, no odor. 30.75-31.5': SAND, fine grained with trace silt, brown, moist to wet, no odor.	100	GW SP	0.0	Bentonite Backfill
8 32 50/4		GLMW-1-35	35-36.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to wet, no odor.	100	SW	0.1	
7 21 28		GLMW-1-40	40-41.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to wet, no odor.	100	SW	0.1	

30 35 40 45 50 55 60

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/19/2018	Other Information: Well Tag BKZ-664
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 2 of 2	
Logged By: H. Carter		

g-logics

Boring/Well Log
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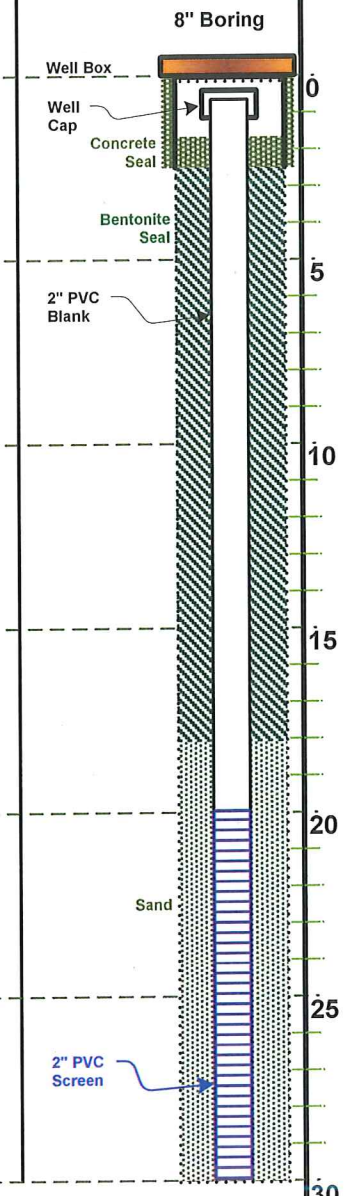
Redmond, Washington

GLMW-1

glmw-2 1.vsd

Depth	BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)
0							
5	5 14 13		GLMW-2-5	5-6.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist, no odor.	40	SW	0.0
10	6 11 11		GLMW-2-10	10-11.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist, no odor.	30	SW	0.1
15	15 28 30		GLMW-2-15	15-16.5': SAND, medium to coarse grained with fine to coarse gravel, brown, dry, no odor.	40	SW	0.0
20	24 50/4		GLMW-2-20	20-21.5': SAND, coarse grained with fine to coarse gravel, brown, wet, no odor. Very thin layer of silty sand at 21.5'.	20	SW	0.1
25	20 50/3		GLMW-2-25	25-26.5': SAND, fine to medium grained with trace gravel, brown, wet, no odor.	70	SP	0.0
30	Depth in feet						

WELL CONSTRUCTION



Drilling Method: Hollow-stem auger	Date: 6/19/2018	Other Information: Well Tag BKZ-664
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 1 of 2	
Logged By: H. Carter		

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Redmond, Washington

GLMW-2

glmw-2 2.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
							8" Boring
30 3 15 27		GLMW-2-30	30-31.5': SAND, fine to medium grained with trace gravel, brown, moist to wet, no odor.	100	SP	0.0	Bentonite Backfill
35 11 14 18		GLMW-2-35	35-36.5': SAND, medium grained with trace gravel, brown, moist to wet, no odor.	90	SP	0.1	
40 3 9 13		GLMW-2-40	40-41.5': SAND, medium grained with trace gravel, brown, wet, no odor.	30	SP	0.1	
45							
50							
55							
60							

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/19/2018	Other Information: Well Tag BKZ-664
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 2 of 2	
Logged By: H. Carter		

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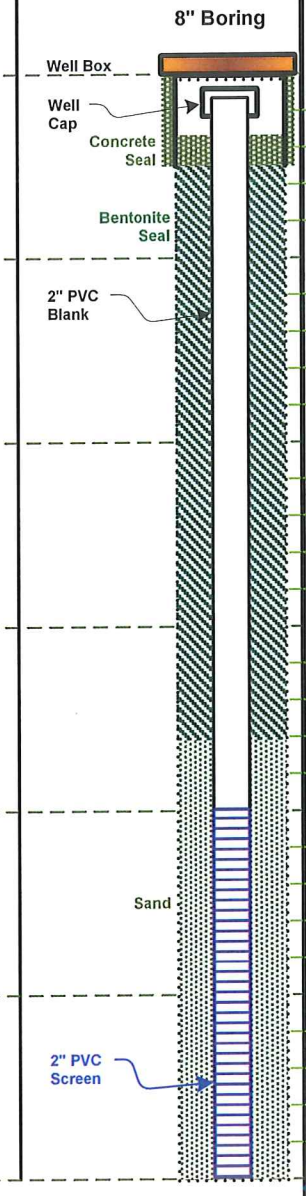
GLMW-2

glmw-3 1.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)
2 4 4		GLMW-3-2.5	2.5-4': SAND, fine grained with fine gravel, brown, dry, slight petroleum odor, woodchips at 4'.	10	SW	6.1
12 18 14		GLMW-3-5	5-6.5': SAND, fine grained with fine to coarse gravel, brown, dry, no odor.	15	SW	2.8
10 37 10		GLMW-3-10	10-11.5': SAND, medium grained with fine to coarse gravel, brown, moist to dry, no odor.	50	SW	0.3
20 40 41		GLMW-3-15	15-16.5': SAND, medium grained with fine to coarse gravel, brown, moist to dry, no odor.	60	SW	0.1
34 17 19		GLMW-3-20	20-21.5': SAND, medium grained with fine to coarse gravel, brown, wet, no odor.	10	SW	0.0
2 8 32		GLMW-3-25	25-26.5': SAND, fine to medium grained with trace gravel, gray brown, moist, no odor.	100	SP	0.1

WELL CONSTRUCTION



Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information: Well Tag BKZ-665	
Drilling Company: Holocene	Weather: Sunny		
Boring Diameter: 8"	Page 1 of 2		
Logged By: H. Carter			

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GLMW-3

glmw-3 2.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
							8" Boring
14 50/6		GLMW-3-30	30-31.5': SAND, fine to medium grained with trace gravel, brown, moist to wet, no odor.	100	SP	0.0	Bentonite Backfill
6 17 47		GLMW-3-35	35-36.5': SAND, medium grained with trace gravel, brown, moist to wet, no odor.	100	SP	0.0	
6 17 32		GLMW-3-40	40-41.5': SAND, fine to medium grained with trace gravel, brown, wet, no odor.	90	SP	0.0	

30 35 40 45 50 55 60

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information: Well Tag BKZ-665
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 2 of 2	
Logged By: H. Carter		

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GLMW-3

glb-1.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
0							Temporary Boring, Backfilled with Bentonite
5 10 11		GLB-1-2.5	2.5-4': SAND, medium to coarse grained with fine to coarse gravel, brown, moist, no odor.	5	SW	0.3	
5 14 16 20		GLB-1-5	5-6.5': SAND, fine grained with fine to coarse gravel, gray brown, dry, no odor.	<5		0.0	
16 50/5		GLB-1-7.5	7.5-9': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	15	SW		
10 8 11 7		GLB-1-10	10-11.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	30	SW	0.0	
15			No Recovery				
20 50/5		GLB-1-20	20-21.5': SAND, coarse grained with fine to coarse gravel, gray brown, wet, no odor.	15	SW	0.1	
25							
30							

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information:
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 1 of 1	
Logged By: H. Carter		

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Redmond, Washington

GLB-1

glb-2.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
0							Temporary Boring, Backfilled with Bentonite
7 11 6		GLB-2-2.5	2.5-4': SAND, medium grained with fine to coarse gravel, brown, dry, no odor.	10	SW	0.2	
5 7 11 18		GLB-2-5	5-6.5': SAND, medium grained with fine to coarse gravel, brown, dry, no odor.	5	SW	0.3	
			No Recovery				
10 13 17 12		GLB-2-10	10-11.5': SAND, fine to medium grained with fine to coarse gravel, brown, dry, no odor.	5	SW	0.3	
15 10 19 19		GLB-2-15	10-11.5': SAND, fine to medium grained with fine to coarse gravel, brown, dry, no odor.	40	SW	0.4	
20 10 7 4		GLB-2-20	20-21.5': SAND, fine to medium grained with fine to coarse gravel, brown, wet, no odor.	10	SW	0.3	
25							
30							

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information:
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 8"	Page 1 of 1	
Logged By: H. Carter		

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GLB-2

glb-3.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-4': SAND, very fine to fine grained with fine to coarse gravel and silt, brown, moist, no odor.		SW		Temporary Boring, Backfilled with Bentonite
		GLB-3-4		20		0.0	
			4-19': SAND, medium grained with fine to coarse gravel, brown, dry, no odor.				
		GLB-3-8		15	SW	0.0	
		GLB-3-12		15	SW	0.0	
		GLB-3-16		20	SW	0.0	
		GLB-3-20	19-24': SAND, medium to coarse grained with fine to coarse gravel and trace silt, brown, wet, no odor.	60 ▽		0.0	
		GLB-3-24		70	SW ▽	0.0	

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/19/2018	Other Information:
Drilling Company: Holocene	Weather: Sunny	
Boring Diameter: 2"	Page 1 of 1	
Logged By: H. Carter		

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GLB-3

glb-4.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-9': SAND, very fine to fine grained with fine to coarse gravel and silt, light brown, dry, no odor.		SW		Temporary Boring, Backfilled with Bentonite
		GLB-4-5		70		0.0	
		GLB-4-9	9-12': SAND, very fine to fine grained with fine to coarse gravel and silt, red, dry, slight petroleum odor.	60	SW	0.0	
		GLB-4-12	12-16': SAND, very fine to fine grained with fine to coarse gravel and silt, light brown, dry, no odor.	30	SW	0.0	
		GLB-4-16	16-19': SAND, fine grained with fine to coarse gravel and trace silt, red, dry, no odor.	30	SW	0.2	
		GLB-4-19		40	▽	0.6	

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/19/2018
Drilling Company: Holocene	Weather: Sunny
Boring Diameter: 2"	Page 1 of 1
Logged By: H. Carter	

Other Information:
Drill tip stuck in ground at 10'. Had to move hole and re-drill.

g-logics

Boring/Well Log
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Redmond, Washington

GLB-4

glb-5.vsd

Depth	BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
0								Temporary Boring, Backfilled with Bentonite
				No Recovery				
5	6 7 9		GLB-5-5	5-6.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	10		0.0	
	11 50/6		GLB-5-7.5	7.5-9': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	5	SW	0.0	
10	14 19 12		GLB-5-10	10-11.5': SAND, medium to coarse grained with fine to coarse gravel, brown, moist to dry, no odor.	5	SW	0.0	
15	4 12 19		GLB-5-15	10-11.5': SAND, fine to medium grained with trace silt, brown, moist to dry, no odor.	40	SP	0.0	
20	22 50/3		GLB-5-20	20-21.5': SAND, medium to coarse grained with fine to coarse gravel, brown, wet, no odor.	10	SW	0.0	
25								
30								

Depth in feet

Drilling Method: Hollow-stem auger	Date: 6/20/2018	Other Information:	
Drilling Company: Holocene	Weather: Sunny		
Boring Diameter: 8"	Page 1 of 1		
Logged By: H. Carter			

g-logics

Boring/Well Log
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Redmond, Washington

GLB-5

glb-6.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-2.5': SAND, fine grained with silt and occasional gravel, brown, dry, no odor.				Temporary Boring, Backfilled with Bentonite
		GLB-6-2.5	2.5-13': SAND, medium to coarse grained with fine to coarse gravel and silt, brown, dry to moist, no odor.	30	SW	0.0	
		GLB-6-7.5		50	SW	0.0	
		GLB-6-10				0.0	
		GLB-6-13	13-15': SAND, coarse grained with silt and trace gravel, brown, slightly moist, no odor.	100	SP	0.0	
			15-20': SAND, medium to coarse grained with fine to coarse gravel, brown, dry to wet (20'), no odor.		SW		
		GLB-6-20		40		0.0	

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/26/2018	Other Information:
Drilling Company: Holocene	Weather: Cloudy	
Boring Diameter: 2"	Page 1 of 1	
Logged By: Z. Wall		

g-logics

Boring/Well Log
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Redmond, Washington

GLB-6

glb-7.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-10': SAND, fine grained with silt and trace gravel, brown, dry, no odor.		SW		Temporary Boring, Backfilled with Bentonite
		GLB-7-5		5		0.0	
					SW		
		GLB-7-10		5		0.8	
			10-15': SAND, fine to coarse grained with fine to coarse gravel, brown, slightly moist, no odor.		SW		
		GLB-7-15		75		0.0	
			15-23': SAND, medium to coarse grained with fine to coarse gravel and silt, brown, dry to slightly moist, no odor.		SW		
		GLB-7-20		100		0.0	
		GLB-7-23	23-25': SAND, coarse grained with fine to coarse gravel, brown, wet, no odor.	▽	SW	0.0	
				100	▽		

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/26/2018	Other Information:
Drilling Company: Holocene	Weather: Cloudy	
Boring Diameter: 2"	Page 1 of 1	
Logged By: Z. Wall		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

GLB-7

glb-8.vsd

BLOWS/6 inches	INTERVAL	SAMPLE NUMBER	SOIL DESCRIPTION	Recovery %	USCS	PID (ppmv in headspace)	WELL CONSTRUCTION
			0-5': SAND, fine to medium grained with silt, Gravel, and wood, brown, dry, no odor.		SW		Temporary Boring, Backfilled with Bentonite
		GLB-8-5		5		0.0	
			5-8': GRAVEL, fine to coarse grained with sand and silt, light brown, dry, no odor.		GW		
		GLB-8-10	8-10': SAND, fine to coarse grained with fine to coarse gravel, brown, dry, no odor.	5		0.0	
			No Recovery	75	SW		
			No Recovery	100	SW		
		GLB-8-20	23-25': SAND, fine to medium grained with fine to coarse gravel, brown, dry, no odor.		SW	0.0	
		GLB-8-25		100		0.0	

0 5 10 15 20 25 30

Depth in feet

Drilling Method: Direct Push	Date: 6/26/2018	Other Information:
Drilling Company: Holocene	Weather: Cloudy	
Boring Diameter: 2"	Page 1 of 1	
Logged By: Z. Wall		

g-logics

Boring/Well Log
Evans Auto Center
7440 159th Place NE
Redmond, Washington

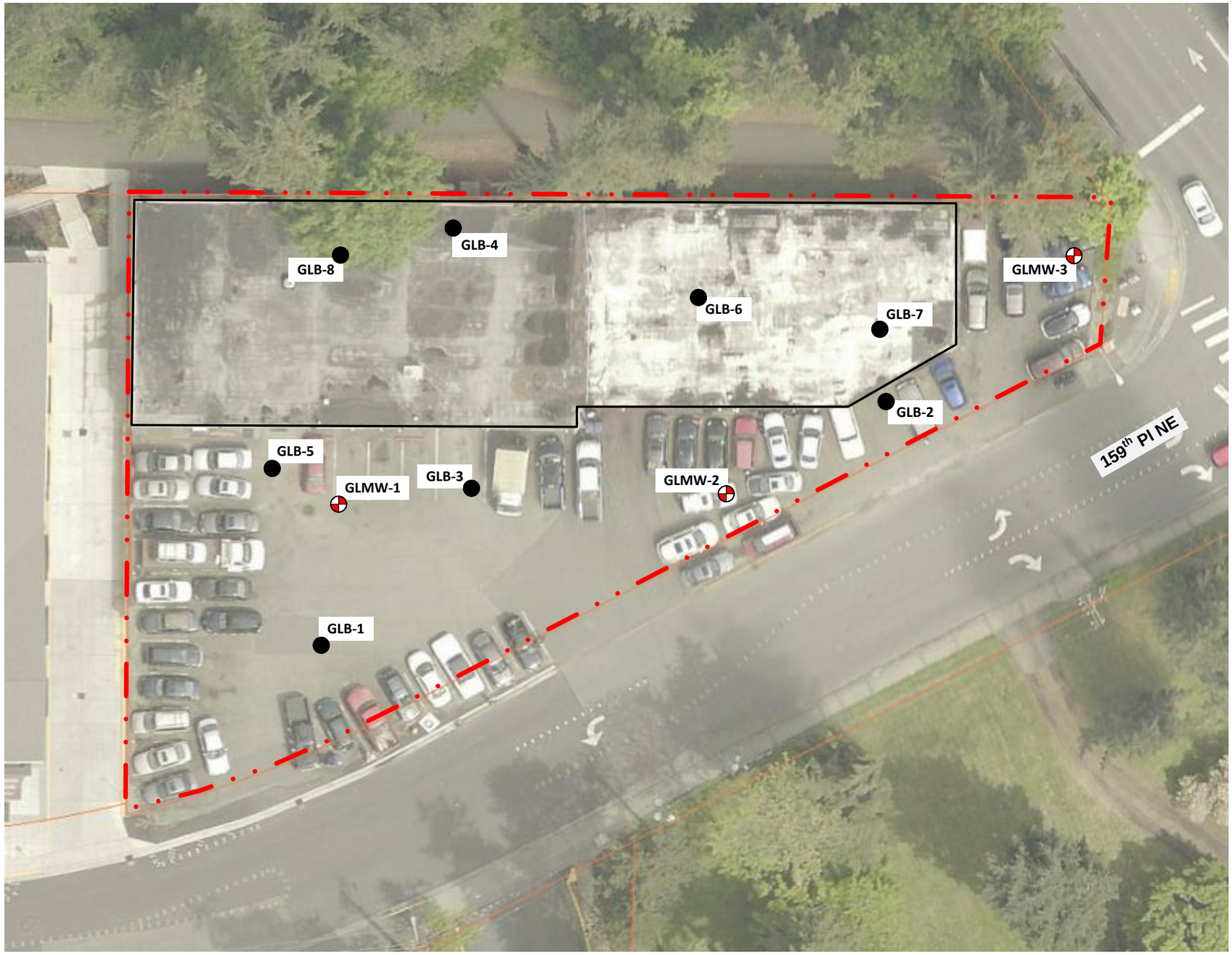
GLB-8

APPENDIX B
Previous Environmental Data

N

Legend

- Approximate Property Boundary
- Building Outline
- Soil Boring Location
- Groundwater-Monitoring Well Location



Approximate Drawing Scale: 1" = 30'

0 ft. 18 ft. 30 ft. 60 ft.

Note: This figure contains information in color. Black & white photocopies may not be suitable for review.

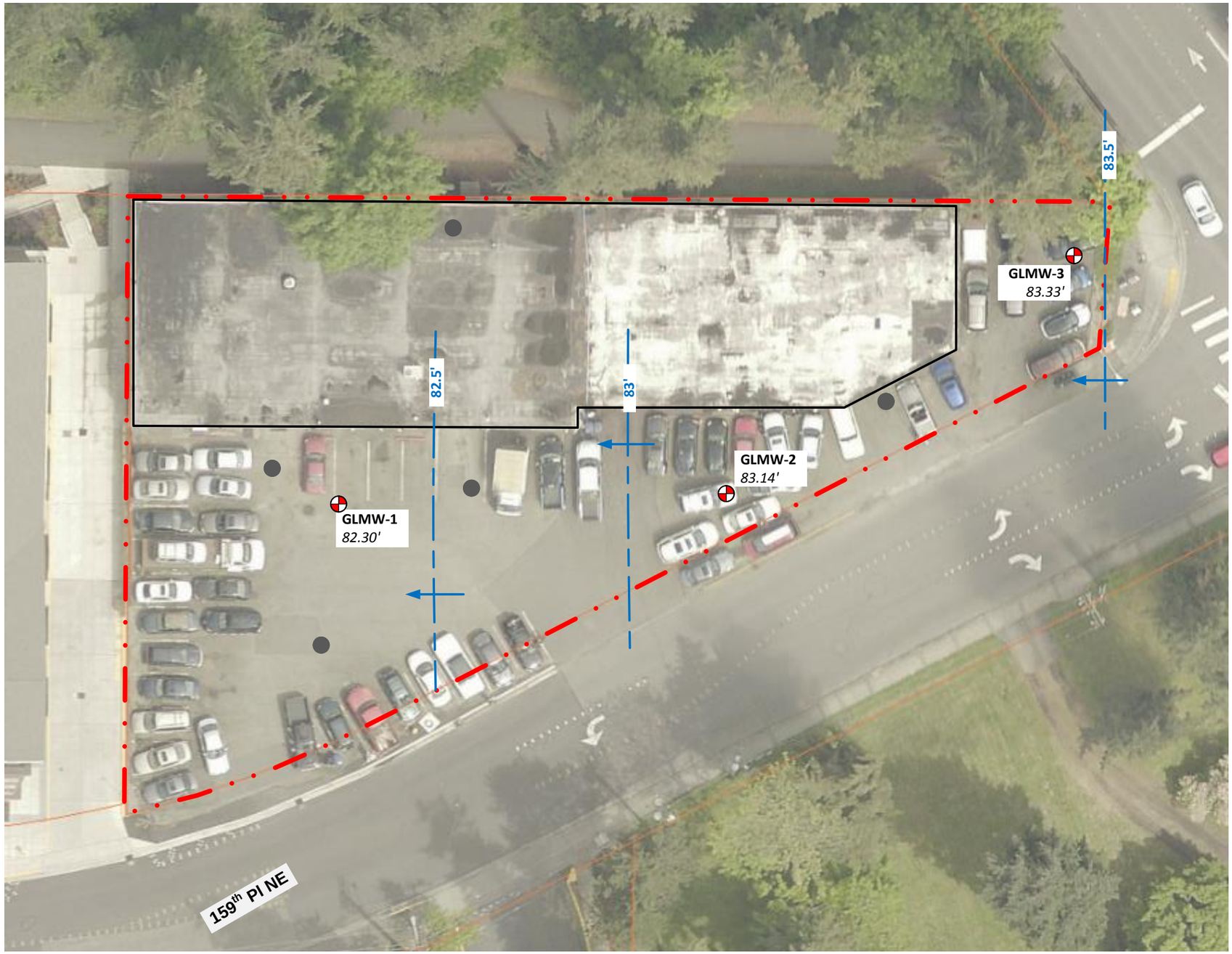
Site Diagram, Exploration Locations
Evans Auto Center
7440 159th Place NE
Redmond, Washington

Figure 2

Project File: 01-1219-B F2.vsd

g-logics

Mapping Reference: King County iMap



Legend

- Understood Property Boundary
- Building Outline
- Soil Boring Location
- Monitoring Well Location
- Interpreted GW Elevation Contour
- Interpreted GW Flow Direction

g-logics

Approximate Drawing Scale: 1" = 30'

0 ft. 18 ft. 30 ft. 60 ft.

Note: This figure contains information in color. Black & white photocopies may not be suitable for review.

Groundwater Contours, June 2018

Evans Auto Center

7440 159th Place NE

Redmond, Washington

Figure 3

Mapping Reference: King County iMap

Project File: 01-1219-B F3 GW Contours.vsd

TABLE 1
Soil Sample Analysis
Evans Auto Center
7440 159th Place NE
Redmond, Washington

Exploration Location	Sample Date	Sample Number	Sample Depth (ft)	PID Reading (ppmv) (a)	Gasoline Range Organics	Diesel Range Organics	Heavy Oil Range Organics	Benzene	Toluene	Ethylbenzene	Xylenes	Other VOCs	Arsenic	Cadmium	Chromium (III)	Chromium (VI, Hexavalent)	Lead	Mercury	PCBs
MTCA Method A Cleanup Level				NA	100(b)/30(c)	2,000	2,000	0.03	7.00	6.00	9.00	various	20.0	2.00	2,000	19.0	250	2.0	various
(units in mg/kg)																			
GLMW-1	6/19/2018	GLMW-1-5	5	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-10	10	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-15	15	0.1	<6.26	<20.6	<51.4	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-20	20	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-25	25	0.1	<5.02	<20.9	<52.2	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-30	30	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-35	35	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-1-40	40	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
GLMW-2	6/19/2018	GLMW-2-5	5	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-10	10	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-15	15	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-20	20	0.1	<5.40	<21.7	<54.3	<0.0216	**0.0244**	<0.0270	<0.0540	nd	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-25	25	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-30	30	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-35	35	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLMW-2-40	40	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
GLMW-3	6/20/2018	GLMW-3-2.5	2.5	6.1	<6.52	<20.0	<50.1	<0.0261	<0.0261	<0.0326	<0.0652	nd	---	---	---	---	---	---	---
	6/20/2018	GLMW-3-5	5	2.8	<7.05	<20.6	<51.5	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLMW-3-10	10	0.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLMW-3-15	15	0.1	<6.11	<18.6	<46.6	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLMW-3-20	20	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLMW-3-25	25	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 1
Soil Sample Analysis
Evans Auto Center
7440 159th Place NE
Redmond, Washington

Exploration Location	Sample Date	Sample Number	Sample Depth (ft)	PID Reading (ppmv) (a)	Gasoline Range Organics	Diesel Range Organics	Heavy Oil Range Organics	Benzene	Toluene	Ethylbenzene	Xylenes	Other VOCs	Arsenic	Cadmium	Chromium (III)	Chromium (VI, Hexavalent)	Lead	Mercury	PCBs
MTCA Method A Cleanup Level				NA	100(b)/30(c)	2,000	2,000	0.03	7.00	6.00	9.00	various	20.0	2.00	2,000	19.0	250	2.0	various
(units in mg/kg)																			
GLB-1	6/20/2018	GLB-1-2.5	2.5	0.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-1-5	5	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-1-7.5	7.5	0.2	<5.36	<19.0	<47.4	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-1-10	10	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-1-20	20	0.0	<5.67	<22.4	<56.0	---	---	---	---	---	---	---	---	---	---	---	---
GLB-2	6/20/2018	GLB-2-2.5	2.5	0.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-2-5	5	0.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-2-10	10	0.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-2-15	15	0.4	---	<19.4	<48.4	<0.0247	<0.0247	<0.0309	<0.0617	nd	**5.09**	<0.154	**32.4**	<0.516	**2.07**	<0.250	---
	6/20/2018	GLB-2-20	20	0.3	<5.61	<23.1	<57.7	---	---	---	---	---	---	---	---	---	---	---	---
GLB-3	6/19/2018	GLB-3-4	4	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-3-8	8	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-3-12	12	0.0	---	<19.3	**200**	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-3-16	16	0.0	---	<18.1	**149**	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-3-20	20	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-3-24	24	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
GLB-4	6/19/2018	GLB-4-5	5	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-4-9	9	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-4-12	12	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-4-16	16	0.2	<6.47	<20.5	<51.4	---	---	---	---	---	---	---	---	---	---	---	---
	6/19/2018	GLB-4-19	19	0.6	---	<18.0	**466**	---	---	---	---	---	---	---	---	---	---	---	---
GLB-5	6/20/2018	GLB-4-5	5	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-4-7.5	7.5	0.0	<6.37	<18.7	<46.6	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-4-10	10	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-4-15	15	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/20/2018	GLB-4-20	20	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 1
Soil Sample Analysis
Evans Auto Center
7440 159th Place NE
Redmond, Washington

Exploration Location	Sample Date	Sample Number	Sample Depth (ft)	PID Reading (ppmv) (a)	Gasoline Range Organics	Diesel Range Organics	Heavy Oil Range Organics	Benzene	Toluene	Ethylbenzene	Xylenes	Other VOCs	Arsenic	Cadmium	Chromium (III)	Chromium (VI, Hexavalent)	Lead	Mercury	PCBs
MTCA Method A Cleanup Level				NA	100(b)/30(c)	2,000	2,000	0.03	7.00	6.00	9.00	various	20.0	2.00	2,000	19.0	250	2.0	various
(units in mg/kg)																			
GLB-6	6/26/2018	GLB-6-2.5	2.5	0.0	<5.85	<21.9	<54.6	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-6-7.5	7.5	0.0	---	<18.2	<45.6	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-6-10	10	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-6-13	13	0.0	<6.85	<18.6	<46.5	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-6-20	20	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
GLB-7	6/26/2018	GLB-7-5	5	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-7-10	10	0.8	**14.2**	<20.7	**343**	<0.0212	**0.334**	**0.0793**	**0.541**	nd	**5.24**	**0.329**	**43.9**	---	**4.81**	<0.250	nd
	6/26/2018	GLB-7-15	15	0.0	<7.84	<20.1	<50.2	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-7-20	20	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-7-23	23	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
GLB-8	6/26/2018	GLB-8-5	5	0.0	<7.17	<20.6	<51.5	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-8-10	10	0.0				---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-8-20	20	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/26/2018	GLB-8-25	25	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Notes: Refer to site diagram(s) for sampling locations. Refer to laboratory reports for analytical methods.

(1) Available Method A Cleanup Levels or Most Conservative Method B Cleanup Levels, MTCA, revised 2013.

(a) Soil samples were field screened using a PID to measure VOCs. Headspace VOC concentrations were measured after placing the soil in a sealed plastic bag and allowing soil and air inside the bag to equilibrate.

(b) Soil Cleanup Level for Gasoline with no detectable benzene in the soil.

(c) Soil Cleanup Level for Gasoline with detectable benzene in the soil.

--- Sample not analyzed.

nd Other VOC sample concentrations below laboratory reporting limits.

<50.0 Sample concentration below laboratory reporting limit.

27 Bold number(s) indicates contaminant detected, below cleanup level.

160 Bold number(s) and yellow shading indicates concentration exceeds MTCA Cleanup Level.

TABLE 2
Groundwater Sample Analysis
Evans Auto Center
7440 159th Place NE
Redmond, Washington

Exploration Location	Sample Date	Sample Number	Gasoline Range Organics	Diesel Range Organics	Heavy Oil Range Organics	Benzene	Toluene	Ethylbenzene	Xylenes	Other VOCs	Arsenic	Arsenic, Dissolved	Cadmium	Chromium (Total)	Lead	Mercury
MTCA Cleanup Level(1)			1,000(a)/800(b)	500	500	5.00	1,000	700	1,000	various	5	5	5	50	15	2
(units in ug/L)																
GLMW-1	6/21/2018	GLMW-1	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	nd	**10.9**	**10.2**	<0.200	**2.48**	**0.826**	<0.100
GLMW-2	6/21/2018	GLMW-2	<50.0	<50.0	<99.9	<1.00	<1.00	<1.00	<1.00	nd	**11.5**	**12.9**	<0.200	**1.01**	<0.500	<0.100
	6/21/2018	GLMW-A (Dup)	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	nd	**12.4**	---	<0.200	**1.02**	<0.500	<0.100
GLMW-3	6/21/2018	GLMW-3	<50.0	<50.0	<99.9	<1.00	<1.00	<1.00	<1.00	nd	**7.61**	**7.43**	<0.200	**2.21**	<0.500	<0.100

Notes: Refer to site diagram(s) for sampling locations. Refer to laboratory reports for analytical methods.

(1) Available Method A Cleanup Levels or Most Conservative Method B Cleanup Levels, MTCA, revised 2015.

(a) Groundwater Cleanup Level for Gasoline with no detectable benzene in groundwater.

(b) Groundwater Cleanup Level for Gasoline with detectable benzene in the groundwater.

Dup Duplicate Sample for QA/QC.

nd Other VOC sample concentrations below laboratory reporting limits.

<50.0 Sample concentration below laboratory reporting limit.

27 Bold number(s) indicates contaminant detected, below cleanup level.

160 Bold number(s) and yellow shading indicates concentration exceeds MTCA Cleanup Level. Adjusting these concentrations for ecology-identified concentrations yields detected concentrations below Method A cleanup levels.

Table 3
Groundwater Elevation Measurements
Evans Auto Center
7440 159th Place NE
Redmond, Washington

Location Designation	Well Installation Date	Elevation Top of PVC Casing (ft.)*	Depth to Top of Screen (ft.)	Depth to Bottom of Screen (ft.)	Well Diameter (in.)	Date Measured	Depth to Water (ft.)	Calculated Elevations (ft.)
GLMW-01	6/19/18	100.71	20	30	2	06/21/18	18.41	82.30
GLMW-02	6/19/18	101.17	20	30	2	06/21/18	18.03	83.14
GLMW-03	6/20/18	102.29	20	30	2	06/21/18	18.96	83.33

Notes:

* Elevations Based off SE Corner of the Catch Basin along 159th Place NE

APPENDIX C
Report Limitations and Guidelines for Use

APPENDIX C
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

It is important to recognize that the geoscience practices (geotechnical engineering, geology and environmental science) rely on professional judgment and opinion to a greater extent than other engineering and natural science disciplines, where more precise and/or readily observable data may exist. To help clients better understand how this difference pertains to our services, GeoEngineers includes the following explanatory "limitations" provisions in its reports. Please confer with GeoEngineers if you need to know more how these "Report Limitations and Guidelines for Use" apply to your project or site.

Geotechnical Services are Performed for Specific Purposes, Persons and Projects

This report has been prepared for G. W. Williams Co., Cleverly Development Consulting and members of the design team for the Project specifically identified in this report. The information contained herein is not applicable to other sites or projects.

GeoEngineers structures its services to meet the specific needs of its clients. No party other than the party to whom this report is addressed may rely on the product of our services unless we agree to such reliance in advance and in writing. Within the limitations of the agreed scope of services for the Project, and its schedule and budget, our services have been executed in accordance with our proposal dated November 13, 2018 and generally accepted geotechnical, hydrogeologic and environmental practices in this area at the time this report was prepared. We do not authorize, and will not be responsible for, the use of this report for any purposes or projects other than those identified in the report.

A Geotechnical Engineering or Geologic Report is Based on A Unique Set of Project-Specific Factors

This report has been prepared for the due diligence phase of a proposed residential development to be located at 7440 159th Place NE in Redmond, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

[1] Developed based on material provided by GBA, GeoProfessional Business Association; www.geoprofessional.org.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed structure(s);
- elevation, configuration, location, orientation or weight of the proposed structure;
- composition of the design team; or
- project ownership.

If changes occur after the date of this report, GeoEngineers cannot be responsible for any consequences of such changes in relation to this report unless we have been given the opportunity to review our interpretations and recommendations. Based on that review, we can provide written modifications or confirmation, as appropriate.

Previous Environmental Studies

GeoEngineers makes no warranties or guarantees regarding the accuracy or completeness of information provided or compiled by others. The information presented in this report is based on the above-described research and a single recent site visit. GeoEngineers has relied upon information provided by others in our description of historical conditions and in our review of regulatory databases and files. The available data do not provide definitive information with regard to all past uses, operations or incidents at the subject property or adjacent properties.

Evaluation of site environmental conditions relative to cleanup levels should be evaluated on a case by case basis considering potential receptors (human health, terrestrial ecological) and potential affected media (soil, groundwater, indoor air). Note that hazardous substances may be present in some of the site soil, groundwater and/or indoor air at detectable concentrations that are less than the cleanup levels referenced in previous studies. GeoEngineers should be contacted prior to the export or reuse of soil or groundwater from the subject site to evaluate the potential for associated environmental liabilities. We cannot be responsible for potential environmental liability arising out of the transfer of soil and/or groundwater from the subject Site to another location or its reuse on site in instances that we were not aware of or could not control.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by man-made events such as construction on or adjacent to the site, new information or technology that becomes available subsequent to the report date, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. If more than a few months have passed since issuance of our report or work product, or if any of the described events may have occurred, please contact GeoEngineers before applying this report for its intended purpose so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Geotechnical and Geologic Findings Are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies the specific subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied its professional judgment to render an informed opinion about subsurface conditions at other locations. Actual subsurface conditions may differ, sometimes significantly, from the opinions presented in this report. Our report, conclusions and interpretations are not a warranty of the actual subsurface conditions.

Geotechnical Engineering Report Recommendations Are Not Final

We have developed our preliminary recommendations based on data gathered from subsurface exploration(s). These explorations sample just a small percentage of a site to create a snapshot of the subsurface conditions elsewhere on the site. Such sampling on its own cannot provide a complete and accurate view of subsurface conditions for the entire site. Therefore, the recommendations included in this report are preliminary and should not be considered final. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for the recommendations in this report if we do not perform construction observation.

We recommend that you allow sufficient monitoring, testing and consultation during construction by GeoEngineers to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes if the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork and foundation installation activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective means of managing the risks associated with unanticipated conditions. If another party performs field observation and confirms our expectations, the other party must take full responsibility for both the observations and recommendations. Please note, however, that another party would lack our project-specific knowledge and resources.

A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation

Misinterpretation of this report by members of the design team or by contractors can result in costly problems. GeoEngineers can help reduce the risks of misinterpretation by conferring with appropriate members of the design team after submitting the report, reviewing pertinent elements of the design team's plans and specifications, participating in pre-bid and preconstruction conferences, and providing construction observation.

Do Not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final exploration logs based upon their interpretation of field logs and laboratory data. The logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Photographic or electronic reproduction is acceptable, but separating logs from the report can create a risk of misinterpretation.

Give Contractors a Complete Report and Guidance

To help reduce the risk of problems associated with unanticipated subsurface conditions, GeoEngineers recommends giving contractors the complete geotechnical engineering or geologic report, including these "Report Limitations and Guidelines for Use." When providing the report, you should preface it with a clearly written letter of transmittal that:

- advises contractors that the report was not prepared for purposes of bid development and that its accuracy is limited; and
- encourages contractors to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer.

Contractors Are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and adjacent properties.

Biological Pollutants

GeoEngineers' Scope of Services specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants, and no conclusions or inferences should be drawn regarding Biological Pollutants as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria and viruses, and/or any of their byproducts.

A Client who desires these specialized services is advised to obtain them from a consultant who offers services in this specialized field.

Information on Water Levels in the Ground May Be Confusing

The groundwater information in this report may appear confusing and could be misunderstood. We try to show the depth at which groundwater was encountered on all our boring logs, but in some soils, this can be very different from the true groundwater level. Monitoring wells installed in borings give the most reliable information, but this may apply only to the soil layer(s) in which the well is screened. If the top of the well screen or sand/gravel pack is more than a few feet below the groundwater level, then that groundwater level may not correspond to the true groundwater elevation. Soils that are described on our logs as "wet" are usually below the groundwater level, but perched groundwater can also make the interpretation of groundwater conditions difficult.

Groundwater levels typically vary seasonally by a few feet to as much as 100 feet or more depending on location, site conditions, recharge, and many other factors. If in any doubt, you should have a hydrogeologist from GeoEngineers confer with appropriate members of the design team to help them interpret groundwater level information and apply it to the project. The consequences of misunderstanding groundwater levels can be serious, which impacts can range from drainage problems and inadequate provision for construction dewatering, to water intrusion, hydrostatic instability of the subgrade and uplift of completed structures.

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APPENDIX D
Report Limitations and Guidelines for Use

APPENDIX D
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

It is important to recognize that the geoscience practices (geotechnical engineering, geology and environmental science) rely on professional judgment and opinion to a greater extent than other engineering and natural science disciplines, where more precise and/or readily observable data may exist. To help clients better understand how this difference pertains to our services, GeoEngineers includes the following explanatory "limitations" provisions in its reports. Please confer with GeoEngineers if you need to know more how these "Report Limitations and Guidelines for Use" apply to your project or site.

Geotechnical Services are Performed for Specific Purposes, Persons and Projects

This report has been prepared for G. W. Williams Co., Cleverly Development Consulting and members of the design team for the Project specifically identified in this report. The information contained herein is not applicable to other sites or projects.

GeoEngineers structures its services to meet the specific needs of its clients. No party other than the party to whom this report is addressed may rely on the product of our services unless we agree to such reliance in advance and in writing. Within the limitations of the agreed scope of services for the Project, and its schedule and budget, our services have been executed in accordance with our revised proposal dated May 20, 2019 and generally accepted geotechnical, hydrogeologic and environmental practices in this area at the time this report was prepared. We do not authorize, and will not be responsible for, the use of this report for any purposes or projects other than those identified in the report.

A Geotechnical Engineering or Geologic Report is Based on A Unique Set of Project-Specific Factors

This report has been prepared for the design and permitting phases of The Osprey residential development to be located at 7440 159th Place NE in Redmond, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

[1] Developed based on material provided by GBA, GeoProfessional Business Association; www.geoprofessional.org.

- the function of the proposed structure(s);
- elevation, configuration, location, orientation or weight of the proposed structure;
- composition of the design team; or
- project ownership.

If changes occur after the date of this report, GeoEngineers cannot be responsible for any consequences of such changes in relation to this report unless we have been given the opportunity to review our interpretations and recommendations. Based on that review, we can provide written modifications or confirmation, as appropriate.

Environmental Concerns Are Not Covered

Unless environmental services were specifically included in our geotechnical scope of services, this report does not provide any environmental findings, conclusions, or recommendations, including but not limited to, the likelihood of encountering underground storage tanks or regulated contaminants.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by man-made events such as construction on or adjacent to the site, new information or technology that becomes available subsequent to the report date, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. If more than a few months have passed since issuance of our report or other document, or if any of the described events may have occurred, please contact GeoEngineers before applying this report for its intended purpose so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Geotechnical and Geologic Findings Are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies the specific subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied its professional judgment to render an informed opinion about subsurface conditions at other locations. Actual subsurface conditions may differ, sometimes significantly, from the opinions presented in this report. Our report, conclusions and interpretations are not a warranty of the actual subsurface conditions.

Geotechnical Engineering Report Recommendations Are Not Final

We have developed our preliminary recommendations based on data gathered from subsurface exploration(s). These explorations sample just a small percentage of a site to create a snapshot of the subsurface conditions elsewhere on the site. Such sampling on its own cannot provide a complete and accurate view of subsurface conditions for the entire site. Therefore, the recommendations included in this report are preliminary and should not be considered final. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for the recommendations in this report if we do not perform construction observation.

We recommend that you allow sufficient monitoring, testing and consultation during construction by GeoEngineers to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes if the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork, shoring and foundation installation activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective means of managing the risks associated with unanticipated conditions. If another party performs field observation and confirms our expectations, the other party must take full responsibility for both the observations and recommendations. Please note, however, that another party would lack our project-specific knowledge and resources.

A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation

Misinterpretation of this report by members of the design team or by contractors can result in costly problems. GeoEngineers can help reduce the risks of misinterpretation by conferring with appropriate members of the design team after submitting the report, reviewing pertinent elements of the design team's plans and specifications, participating in pre-bid and preconstruction conferences, and providing construction observation.

Do Not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final exploration logs based upon their interpretation of field logs and laboratory data. The logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Photographic or electronic reproduction is acceptable, but separating logs from the report can create a risk of misinterpretation.

Give Contractors a Complete Report and Guidance

To help reduce the risk of problems associated with unanticipated subsurface conditions, GeoEngineers recommends giving contractors the complete geotechnical engineering or geologic report, including these "Report Limitations and Guidelines for Use." When providing the report, you should preface it with a clearly written letter of transmittal that:

- advises contractors that the report was not prepared for purposes of bid development and that its accuracy is limited; and
- encourages contractors to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer.

Contractors Are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and adjacent properties.

Biological Pollutants

GeoEngineers' Scope of Services specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants, and no conclusions or inferences should be drawn regarding Biological

Pollutants as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria and viruses, and/or any of their byproducts.

A Client who desires these specialized services is advised to obtain them from a consultant who offers services in this specialized field.

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